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Manitoba's forest industry, 1985

T.W. Steele and T.B. Williamson

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MANITOBA'S FOREST INDUSTRY, 1985

T.W. Steele[1] *and T.B. Williamson*[2]

INFORMATION REPORT NOR-X-304

NORTHERN FORESTRY CENTRE
FORESTRY CANADA
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ABSTRACT

The forest industry in Manitoba was surveyed in 1985. The results are analyzed in terms of forest resources, capital, employment impact, capacity and production, markets, annual revenues and expenditures, and socio-economic impact. Numerous tables and figures provide detailed information.

RESUME

Les résultats d'une étude sur l'industrie forestière du Manitoba réalisée en 1980 sont analysés dans ce rapport sur le plan des ressources forestières, des capitaux, des emplois, des possibilités et de la production, des marchés, des recettes et des dépenses annuelles et des effets socioéconomiques. On y trouve un grand nombre de tablaux et de données qui fournissent des renseignements détailles.

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NOTE

The exclusion of certain manufactured products does not necessarily imply disapproval nor does the mention of other products necessarily imply endorsement by Forestry Canada.

CHAPTER I

INTRODUCTION

Manitoba's primary wood-using industry contributes strength and diversity to the provincial economy. As more demands are placed upon the forest resource, policy-making becomes increasingly complex. To assist in the evaluation of policy alternatives, and for effective resource management, decision-makers require detailed information concerning Manitoba's forest sector.

In 1985, a study was initiated by Forestry Canada (then the Canadian Forestry Service) under the Canada–Manitoba Forest Renewal Agreement to determine the current size, structure, and economic impact of the primary wood-using industry in Manitoba. This report describes the status of Manitoba's industry in 1985 and identifies possible directions for future development. Most of the information in this report is presented graphically. The detailed statistics used to generate the figures in this report are available from the Northern Forestry Centre upon request.

Classification of the Forest Industry

The information in this report was collected from primary and secondary sources. Primary data were obtained from a survey of the provincial forest industry conducted by Forintek Canada Corp. Secondary data were obtained from the Manitoba Department of Natural Resources and from various Statistics Canada publications.

The use of two sources of data in evaluating Manitoba's forest industry precludes the adoption of a single representative definition of the industry. Two separate definitions are adopted for this report. The *primary wood-using industries* category includes: pulp, paper, and fiberboard mills, sawmills and planer mills, wood treating plants, building timber plants, post and pole manufacturers, and hog fuel operations. This definition refers to all information resulting from the survey data. The term *forest industry* is based on Statistics Canada SIC categories. Statistics Canada organizes the Canadian forest industry under three broad industry groups: logging, wood industries, and paper and allied industries (Statistics Canada 1980). Specific industries within each of these major groups are provided in Table 1 and in Appendix I.

The locations of Manitoba's primary wood-using industries are indicated in Figures 1 and 2. More-detailed information on data collection techniques is provided in Appendix II.

Table 1. Standard industrial classification code (SIC) of industry groups in the forest industry. (Source: Statistics Canada 1980.)

	Standard industrial classification code	
Industry group	**2 digit**	**3 digit**
Logging	04	
Logging industry		041
Wood industries	25	
Sawmill, planing mill, and shingle mills		251
Veneer and plywood		252
Sash, door, etc.		254
Wooden box and pallet		256
Coffin and casket		258
Other wood industries		259
Paper and allied	27	
Pulp and paper		271
Asphalt roofing		272
Paper box and bag		273
Other converted paper products		279

Manitoba's Forest Sector: Physical Flows

Manitoba's forest sector may be described as a series of interrelated components. These interrelated components can be used to simulate the physical flow of wood fiber from the standing tree to the finished product. Canham (1985) identified four independent activity stages that make up the regional forestry-based system (Fig. 3):

1. forest land ownership and management;
2. timber harvesting;
3. primary processing; and
4. secondary manufacturing.

This document concentrates on the input and output flows that occur at stages 2 and 3. At the timber harvesting stage (Stage 2) standing timber is converted to roundwood and transported to mill sites.

At the primary processing stage (Stage 3), roundwood is converted into products by means of mechanical and/or chemical processes. Examples of products manufactured at this stage include lumber, posts, poles, pulp, paper, and fiberboard products.

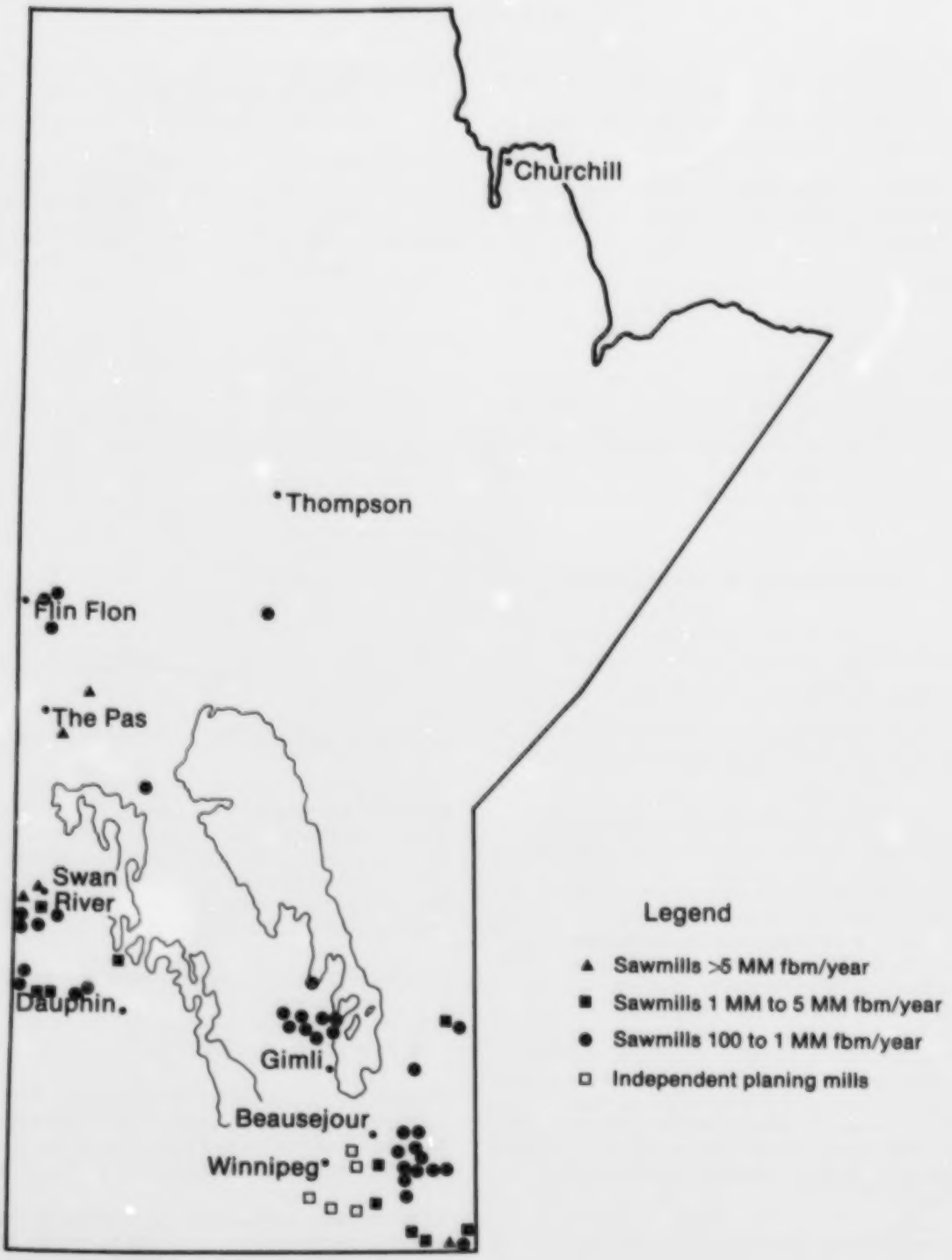

Figure 1. Location of sawmills and independent planing mills.

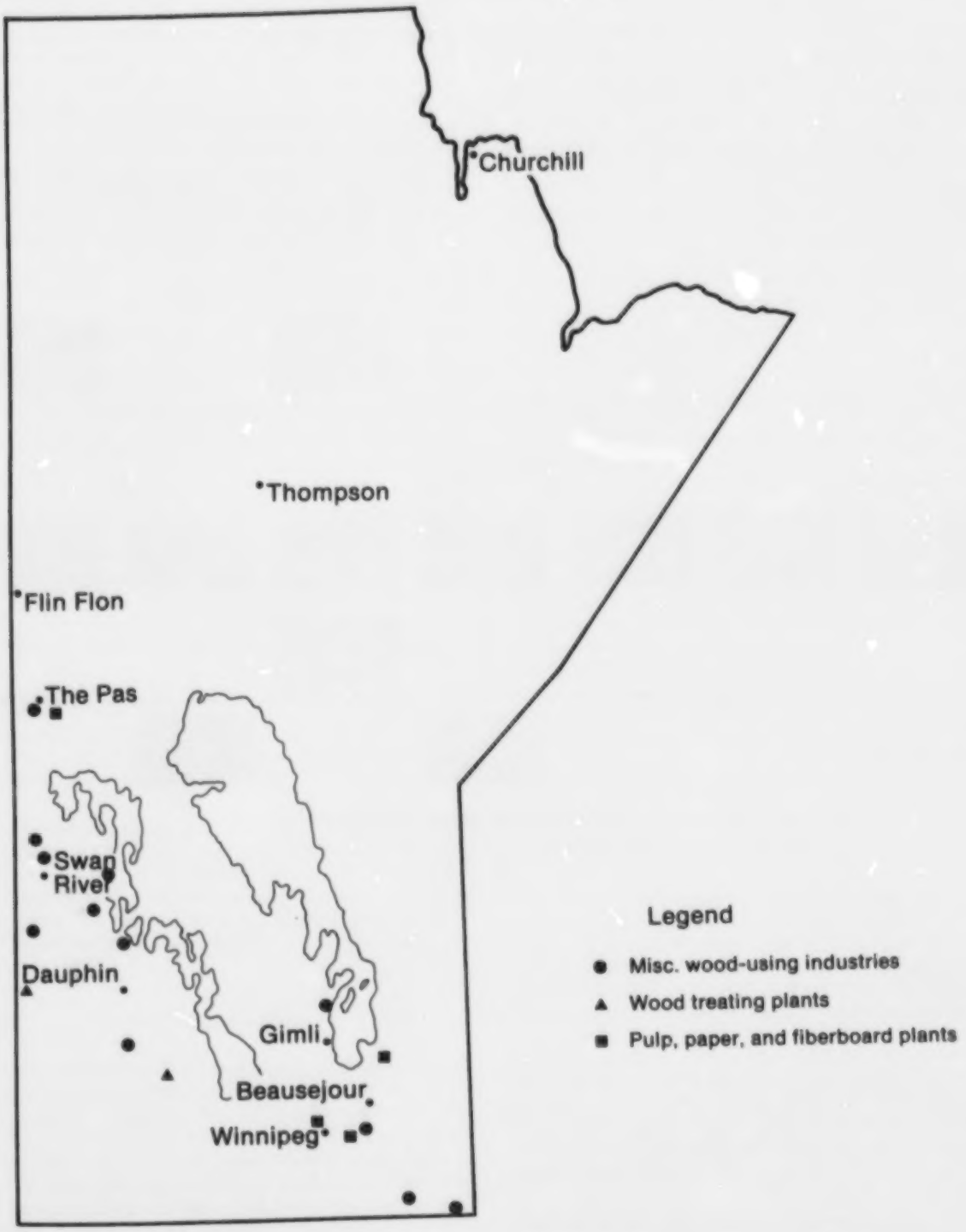

Figure 2. Location of wood treating plants; pulp, paper, and fiberboard plants; and miscellaneous wood- using industries.

These materials are the feedstock for additional processing at the secondary manufacturing stage (Stage 4). Products manufactured at this level include sashes, doors, kitchen cupboards, wooden boxes, pallets, coffins, corrugated paper boxes, treated papers, tissues, and many others.

The socioeconomic impacts of the forest sector are a consequence of payments made for the inputs and outputs that occur at each activity stage. Primary processing inputs are labor, capital, raw materials, and other goods and services. Outputs include the physical goods produced. Both inputs and outputs may be locally acquired and consumed or imported and exported. The purchase of goods and services from the local economy generates indirect activity within the economy (Canham 1985). This indirect economic activity is referred to as a multiplier effect, and is measured by deriving employment, income, and output multipliers.

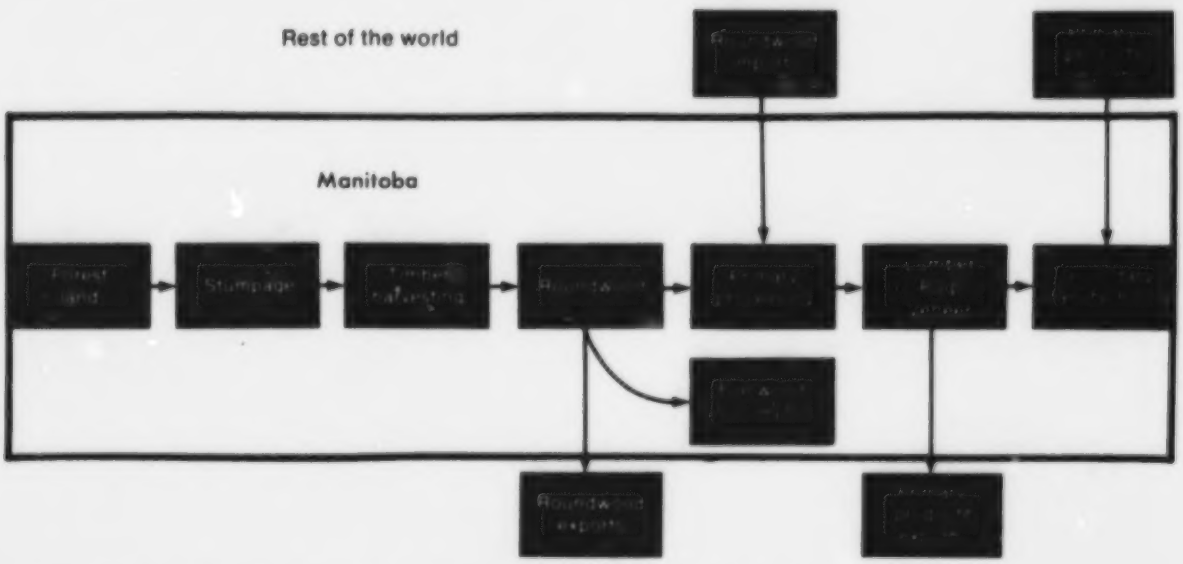

Figure 3. Manitoba's forest system—physical flows. (Source: Canham 1985.)

CHAPTER II

MANITOBA'S TIMBER SUPPLY

Manitoba's forests yield a variety of benefits including clear water, a habitat for wildlife and fish, recreation opportunities, and wood fiber. This report deals only with the social and economic impacts resulting from the commercial harvest of timber. Although non-timber uses of the forest are important, they are beyond the scope of this report.

The forests of Manitoba contain approximately 745 625 000 m^3 of merchantable timber[1] (Bohning 1987) distributed over 133 000 km^2 of productive forest land. The provincial government owns the majority of this land and plays the leading role in forest management. Figure 4 shows the timber management disposal units designated by the Manitoba Department of Natural Resources. These units are organized at two levels: forest sections and forest management units (FMU). Each forest section in the province is comprised of a number of FMUs. The FMU is the basic forest management area within the province. Annual allowable cuts are calculated at the FMU levels, and each unit is managed on a sustained yield basis.

Area Classification and Tenure

Over 84% or 545 728 km^2 of the province's total area is land (Table 2). Land ownership is distributed among the provincial crown (85%), private owners (14%), and the federal government, local governments, and Indian reserves (1%).

Although Manitoba is a prairie province, 61% of the total land area is forested; of this, 95% (317 707 km^2) is owned by the Province (Table 3). Forty percent (132 959 km^2) of the forest land is productive while another 5% (16 155 km^2) is potentially productive. The remaining 55% (185 322 km^2) is nonproductive forest land.

Forest Regions

Rowe (1972) identified two major ecological forest regions in Manitoba: the Boreal and the Great Lakes-St. Lawrence regions (Fig. 5). The Boreal Forest, the largest forest region in the province, is further divided by Rowe (1972) into 10 separate subtypes, of which only three are commercially important: Manitoba Lowlands, Nelson River, and Northern Coniferous. Black spruce (*Picea mariana* [Mill.] B.S.P.) is the predominant tree species, found on both upland and lowland areas. Jack pine (*Pinus banksiana* Lamb.) is also a very important commercial species and grows in pure stands on sandy soils and on ridge tops throughout the three major subtypes. Frequent wildfires have promoted its establishment. White spruce (*Picea glauca* [Moench] Voss), a valuable sawtimber species, occurs on well-drained alluvial beds in the southern part of the boreal zone (Rowe 1972).

Three tree species of minor commercial value in Manitoba's boreal region are tamarack (*Larix laricina* [Du Roi] K. Koch), balsam poplar (*Populus balsamifera* L.), and trembling aspen (*Populus tremuloides* Michx.). Tamarack, or larch, has a wide range but is generally restricted to bogs and swamps, where it frequently associates with black spruce. Balsam poplar and trembling aspen, collectively referred to as poplar, are widely distributed across the province. They grow in both pure stands and in mixedwood stands (i.e., stands comprised of both softwood and hardwood components) (Rowe 1972).

The second major forest region in the province is the Great Lakes-St. Lawrence Forest Region, occupying the extreme southeastern portion of the province. Rowe (1972) classified the zone as Rainy River. Historically, red and white pines (*Pinus resinosa* Ait. and *Pinus strobus* L.) were prevalent, but extensive logging and fire have resulted in these species being almost completely replaced by jack pine. In low-lying areas, black spruce, tamarack, and eastern white cedar (*Thuja occidentalis* L.) occur.

Distribution by Species and Forest Section

The total merchantable volume of growing stock on Manitoba's productive forest lands is 745 625 000 m^3 (Bohning 1987). Merchantable volume can be disaggregated into softwood (62%) and hardwood (38%). Black spruce is the most important tree species in Manitoba, composing 31% of the total merchantable volume and 50% of the merchantable softwood volume (Fig. 6). Trembling aspen is the second most prominent species (28% of total merchantable volume), followed closely by jack pine (22%). Although white spruce accounts for only 7% of the province's merchantable growing stock, it is a preferred species due to the high quality of lumber it yields.

The Mountain Forest Section has the largest volume (138 452 000 m^3) of growing stock in Manitoba — approximately 64% of the region is hardwood (Fig. 7).

[1] Merchantable timber is considered to have a diameter at breast height greater than or equal to 10 cm.

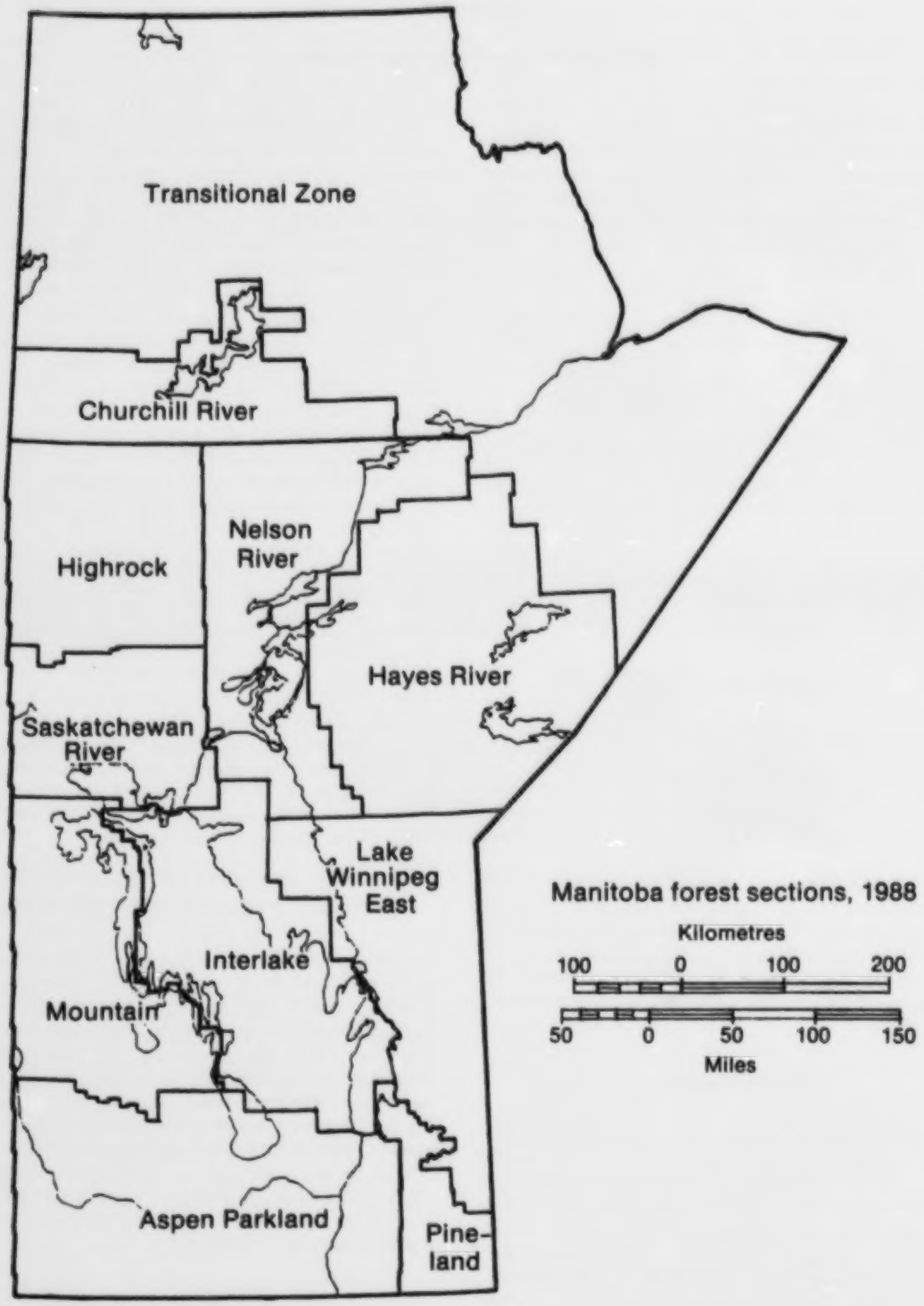

Figure 4. Forest sections: Manitoba Department of Natural Resources. (Source: Manitoba Natural Resources, Forestry Branch.)

Table 2. Area classification and tenure of Manitoba lands. (Source: Manitoba Natural Resources, Forestry Branch.)

Land classification	Area (km^2)	Percentage of Manitoba land area
Provincial crown land		
Closed[a]	5 235	1.0
Open[b]		
Forest zones and parks	137 063	25.1
Forest agreement areas	113 089	20.7
Restricted[c]	2 922	0.5
Others		
Community pasture	1 711	0.3
Tundra and transitional zones	200 815	36.8
Tidal flats	1 878	0.3
Total	462 713	84.8
Private lands	76 088	13.9
Federal crown lands	3 101	0.6
Municipal	14	0.0
Local government districts	1 677	0.3
Indian reserves	2 135	0.4
Total land area	545 728	100
Total water area	104 360	
Total area of Manitoba	650 088	

[a] Closed to harvesting.
[b] Open to harvesting.
[c] Harvesting operations may or may not be allowed depending on specific location factors.

Table 3. Ownership and classification of lands in Manitoba, 1986. (Source: Manitoba Natural Resources, Forestry Branch.)

	Forest land (km^2)				
Land classification	Productive	Potentially productive	Non-productive	Nonforested land	Total
Provincial land					
Closed	3 209	112	1 587	327	5 235
Open					
Forest zones and parks	60 351	7 254	53 177	16 281	137 063
Forest agreement areas	53 293	8 092	44 167	7 537	113 089
Restricted	1 823	138	492	469	2 922
Others					
Community pasture	537	12	97	1 065	1 711
Tundra and transitional	0	0	83 366	117 449	200 815
Tidal flats	0	0	0	1 878	1 878
Private lands	9 692	193	1 783	64 420	76 088
Federal crown lands	2 308	158	170	465	3 101
Municipal	5	0	1	8	14
Local government districts	890	101	194	492	1 677
Indian reserves	851	95	288	901	2 135
Total	132 959	16 155	185 322	211 292	545 728

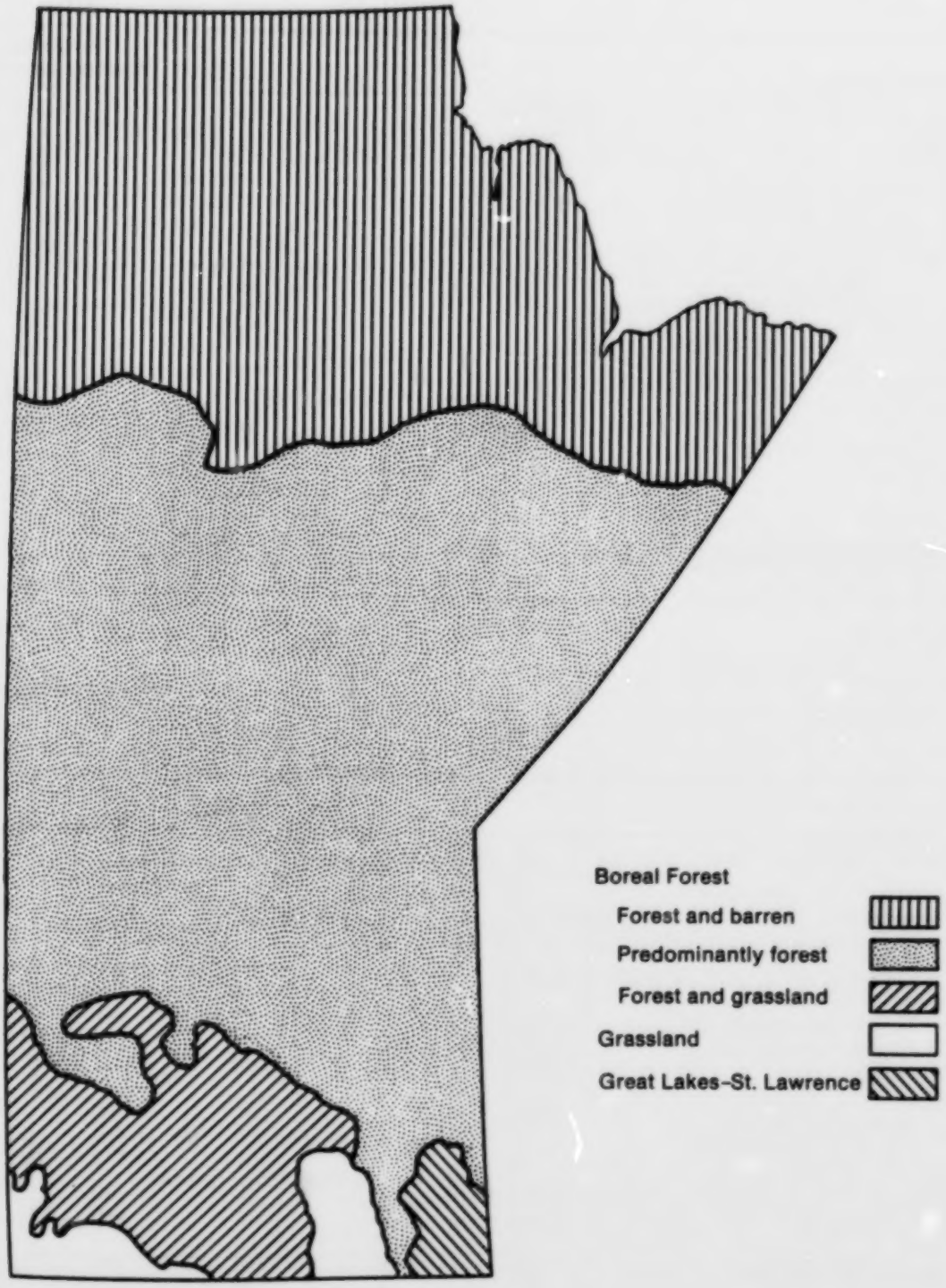

Figure 5. Forest regions of Manitoba. (Source: Rowe 1972.)

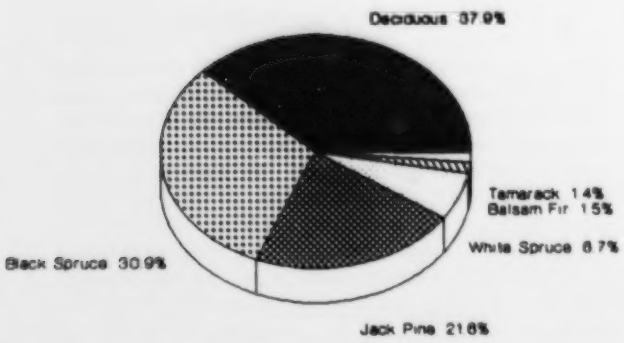

Figure 6. Distribution of tree species by merchantable volume. (Source: Manitoba Natural Resources, Forestry Branch.)

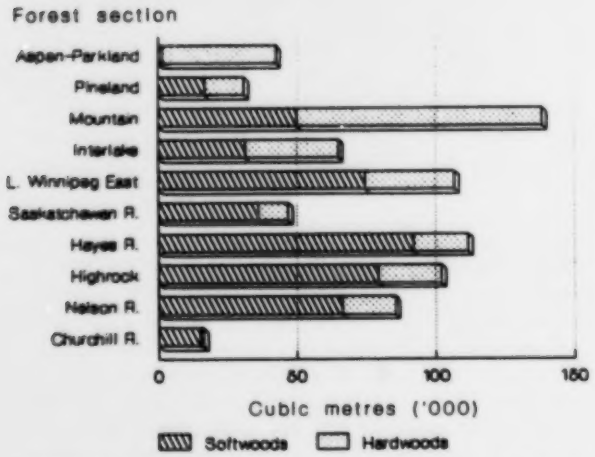

Figure 7. Distribution of merchantable volume by forest section and cover type. (Source: Manitoba Natural Resources, Forestry Branch.)

The second largest forest section is Hayes River with 111 710 000 m^3 of growing stock. Softwoods dominate this section making up 82% of the area's total volume.

The distribution of growing-stock by cover type (i.e., softwood, hardwood, and mixedwood) is illustrated in Figures 8 and 9. On both area and volume bases, pure softwood stands dominate Manitoba's forest. Generally, the distribution of tree species follows a distinct pattern with softwoods prevailing in northern forests and hardwoods prevailing in the south. For example, in the most northerly forest sections (Churchill River, Nelson River, High Rock, Hayes River, Saskatchewan River, and Lake Winnipeg East), 78% of the merchantable volume is softwood. In the south (Interlake, Mountain, Pineland, and Aspen Parkland forest sections), 64% of the growing stock is hardwood.

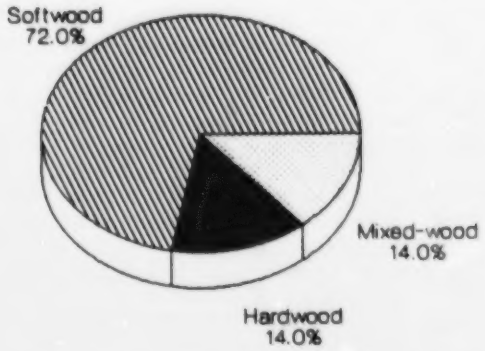

Figure 8. Cover type distribution by area in Manitoba, 1981. (Source: Bonnor 1982.)

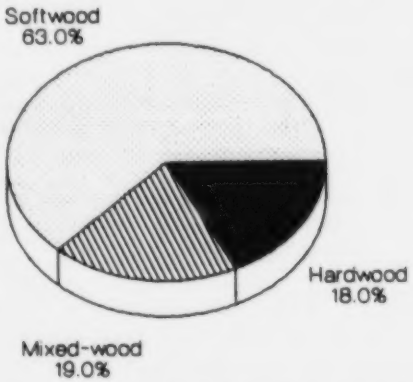

Figure 9. Cover type distribution by volume in Manitoba, 1981. (Source: Bonnor 1982.)

Associated with the variability in cover type are changes in the inherent productive capability of forest sites. Site productivity, a function of age, site, soil, and climatic factors, is usually measured as the mean annual increment (i.e., $m^3/ha/yr$) of the site. A more simplified approach is to measure average volume per hectare. On this basis, the Mountain Forest Section is the most productive in the province with an average productivity of 92.8 m^3/ha (Fig. 10). Conversely, the volume in the Churchill River Forest Section averages only 9.7 m^3/ha. The average site productivity for all of Manitoba's forests is 56 m^3/ha.

Distribution by Size Class

Merchantable growing stock can be categorized into two diameter size classes: 10-24 cm and 24+ cm, measured at breast height (i.e., 1.3 m above the ground). The first category generally represents material suitable for pulpwood and the second category represents material suitable for sawlogs. Figure 11 illustrates the distribution of growing stock in these

size classes for the four most prominent tree species in Manitoba. Only one species, white spruce, has the majority of its volume (53%) in the larger size class. Black spruce, jack pine, and trembling aspen have 5%, 12%, and 28%, respectively, of their gross merchantable volumes in sawlog-sized trees.

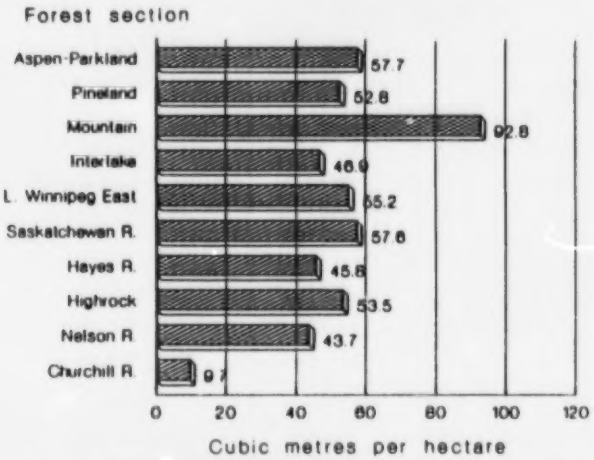

Figure 10. Average volume per hectare by forest section. (Source: Manitoba Natural Resources, Forestry Branch.)

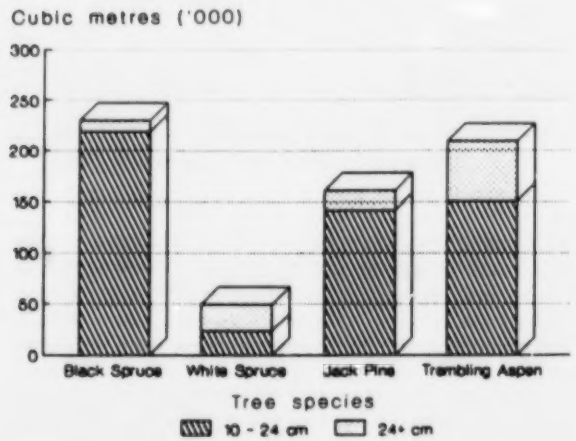

Figure 11. Distribution of growing stock by prominent species and size class. (Source: Manitoba Natural Resources, Forestry Branch.)

Approximately 13% of the province's total softwood growing stock and 30% of the hardwood volume are in the larger diameter class. Nineteen percent of the total provincial growing stock (all species combined) is sawlog-sized material.

Distribution by Maturity Class

Manitoba Natural Resources, Forestry Branch, classifies the forest on the basis of five different age groups: Regeneration — unproven (potentially productive, unstocked lands), Regeneration — proven (seedling stage), Immature (sapling and pole stages), Mature, and Overmature (harvest stage). In terms of both area and volume, the majority of Manitoba forest is in the Immature category (Figs. 12 and 13). A significant portion of the volume (42%) is in the mature and overmature age categories; however, not all is commercially available.

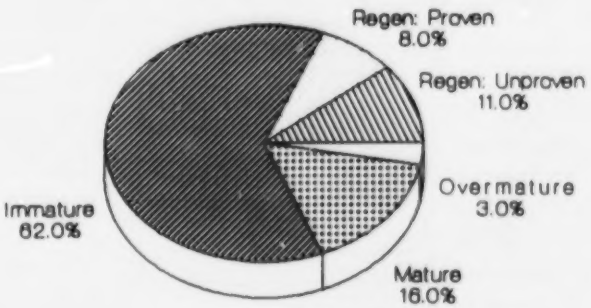

Figure 12. Distribution of growing stock by maturity class (percent of total area). (Source: Manitoba Natural Resources, Forestry Branch.)

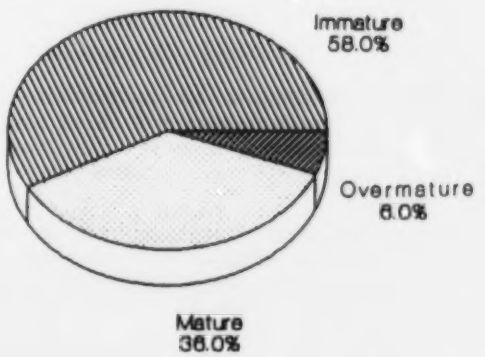

Figure 13. Distribution of growing stock by maturity class (percent of total volume). (Source: Manitoba Natural Resources, Forestry Branch.)

Forest Regulation[2] and Allowable Cut

Davis (1966) described forest regulation as follows: "The essential requirements of a fully regulated forest are that age and size classes be represented in

[2] The notion of the achievement of a normal, fully regulated forest as a management goal is currently undergoing some transition. Recent conceptual advances in forest level management planning "contend that the real skill of the manager is the intelligent management of imbalanced forest structures" (Clutter et al. 1983).

such proportion and be consistently growing at such rates that an approximately equal annual or periodic yield of products of desired size and quality may be obtained. There must be a progression of size and age classes so that harvestable trees in approximately equal volume are regularly available for cutting."

Thus, the purpose of the fully regulated normal forest is to provide an even annual flow of timber on a sustained basis. Central to the concept of the regulated forest is the determination of the annual allowable cut (AAC). Determining the level of the allowable cut is the principal means by which the forest is transformed into the regulated condition required for a continuous and stable timber supply.

The Manitoba AAC is determined by an area allotment method with volume checks that considers area, species, maturity class, site density, and volume. The procedure allows sufficient flexibility to permit the Manitoba Forestry Branch to take factors such as utilization and the economic feasibility of extraction, conversion, and marketing into consideration in establishing resource supply.

The AAC and the average annual actual harvest from open provincial crown land are shown by forest section in Table 4. Every forest section in the province has a surplus of unallocated timber. Only 24% of the softwood AAC and 7% of the hardwood AAC from provincial crown land are being utilized. If this entire surplus volume were economically accessible, then Manitoba's forests would be capable of supporting softwood and hardwood harvests 4.1 and 13.5 times greater than current levels.

A partial explanation for the incomplete utilization of existing AACs is the fact that some of the surplus volumes are currently outside the economically accessible resource base. Nilsson[3] estimated that 54% of the softwood surplus and 22% of the hardwood surplus are economically inoperable. For example, the Churchill River, Nelson River, and Hayes River forest sections support significant volumes of timber, but, in general, lack the transportation network to make harvesting economical.[4]

On the basis of the existing transportation network, seven forest sections are considered accessible: Aspen Parkland, Pineland, Mountain, Interlake, Lake Winnipeg East, Saskatchewan River, and High Rock. Currently, the annual harvest of softwood in these seven forest sections is approximately 44% of their softwood AAC, with 1.8 million m^3 remaining as merchantable softwood surplus. Accessibility, however, is just one factor in determining economic timber supply. Other factors include tree diameters, volumes per hectare, prevalent tree species, and size of stands. Thus, even in areas with a developed transport infrastructure, some of the surplus volume may not be available. Although the entire volume is not economically operable, however, a significant proportion is utilizable and thus provides opportunities for additional development within the forest sector.

Status of Forest Management

During 1981 a 20-year forest management plan was developed in Manitoba. The plan provides a strategy for sound and responsible management of the provincial forest resource to the year 2000. In effect, it is a blueprint for forest utilization, industrial development, and forest management (Manitoba Natural Resources 1987). As a result of the plan, the Forest Act was amended to require the department's minister to table periodically (i.e., every 5 years) reviews on the status and effectiveness of the department's forestry programs. As well, the reports are required to include assessments of the capability of the resource base in meeting anticipated demands. The first report (*Five-year report on the status of forestry*) was presented to the legislature in the spring of 1987. A principal conclusion of the 20-year plan was that given existing (i.e., pre-1984) levels of forest renewal, the softwood timber supply would not be able to meet projected demands within currently utilized forest sections. "The result of taking no action would be the lowering of the AAC by approximately 7% per year as softwood timber supplies decline. The forest industry in Manitoba and all the socio-economic benefits derived from it would also decline at a similar rate" (Manitoba Natural Resources 1987).

Primary responsibility for forest management has traditionally rested with Manitoba Natural Resources, Forestry Branch. In recent years, however, the forest industry has assumed a greater share of forest management responsibilities. For example, in 1981 the Forestry Branch undertook silvicultural treatment of approximately 77% (6312 ha) of the total area treated in the province, while industry treated the remaining 23% (1913 ha). By 1985, the provincial/industry treatment ratio had changed to 57% and 43%, respectively, with 8300 ha treated by the Province and 6269 ha treated by industry (Manitoba Natural Resources 1987).

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[3] Nilsson, S. 1983. Analysis of economically available wood supply in Canada. Unpublished paper presented at the University of Alberta, Department of Rural Economy, Edmonton, Alberta, October 26, 1983. (Mimeogr.)

[4] This is not a permanent condition as the development of new roads in northern Manitoba is an ongoing process.

Table 4. Annual allowable cut and actual harvest by forest section (m^3 per year). (Source: Manitoba Natural Resources 1987.)

Forest section	Softwoods				Hardwoods				Total			
	Annual allowable cut (AAC)	Current cut[a]	Indicated surplus	Surplus as % of AAC	Annual allowable cut (AAC)	Current cut[a]	Indicated surplus	Surplus as % of AAC	Annual allowable cut (AAC)	Current cut[a]	Indicated surplus	Surplus as % of AAC
Aspen Parkland	2 990	1 145	1 845	62	64 750	4 290	60 460	93	67 740	5 435	62 305	92
Mountain	402 180	281 807	120 373	30	578 290	42 415	535 875	50	980 470	324 222	656 248	67
Pineland	179 430	150 724	28 706	16	173 340	86 297	87 043	50	352 770	237 021	115 749	33
Lake Winnipeg East	787 960	299 090	488 870	62	268 520	28 682	239 838	89	1 056 480	327 772	728 708	69
Interlake	450 040	64 266	385 774	86	343 050	7 756	335 294	98	793 090	72 022	721 068	91
Saskatchewan River	484 410	241 510	242 900	50	118 890	2 812	116 078	98	603 300	244 322	358 978	60
Highrock	967 930	398 600	569 330	59	250 080	2 709	247 371	99	1 218 010	401 309	816 701	67
Churchill	81 790	0	81 790	100	7 040	0	7 040	100	88 830	0	88 830	100
Nelson River	952 440	9 913	942 527	99	247 610	2 470	245 140	99	1 200 050	12 383	1 187 667	99
Hayes River	1 608 410	0	1 608 410	100	351 810	0	351 810	100	1 960 220	0	1 960 220	100
Total	5 917 580	1 447 054	4 470 526	76	2 403 380	177 432	2 225 948	93	8 320 960	1 624 486	6 696 474	80

[a] Current cut is average over 5-year period 1981-85.

This transfer in responsibility has been achieved by two agreements. The first agreement is the Abitibi-Price Inc./Manitoba Forest Management License Agreement, which confers upon Abitibi-Price Inc. the right of full utilization[5] of the forest resource within the licensed area, provided forest renewal obligations are satisfactorily met. The agreement is "evergreen" (i.e., continually renewable for 20-year periods), though a review is required at the end of each 5-year management period resulting in a new 20-year period if obligations are met.

The second agreement is between Manitoba Natural Resources and Manfor Ltd. Under this agreement, Manfor assumes responsibility for forest renewal on all lands harvested by the company under its annual operations. By 1988, 80% of the area harvested annually will be treated, and by 1990, all cutover lands harvested annually by the company will be treated by some form of renewal activity (Manitoba Natural Resources 1987).

In addition to industry assuming a greater role in forest management, and in response to the 20-year forest management plan, the overall level of management activity has risen in recent years. The 5-year $27.2 million Canada-Manitoba Forest Renewal Agreement, which has provided funding to Forestry Canada, the Manitoba Forestry Branch, and industry, has largely accounted for the increase in forestry activity. Through this funding, there have been increases in reforestation of nonsatisfactorily regenerated cutover sites, stand improvement activities in plantations and natural stands, and research projects designed to improve silvicultural prescriptions and resource management. Under the Canada-Manitoba Forest Renewal Agreement, which is in effect until 1989, continued expansion is expected in the forest renewal program to a point where approximately 20 000 ha annually will receive some form of silvicultural treatment (Manitoba Natural Resources 1987).

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[5] Abitibi is primarily dependent on the spruce-fir component of its lease area; however, the company does have allocation rights for unused portions of the area.

CHAPTER III

MANITOBA'S PRIMARY WOOD-USING INDUSTRY: A PERSPECTIVE

Industrial Structure

Manitoba's primary wood-using industry is made up of several industry groups, each manufacturing and marketing a distinct product. These groups are: sawmills (with or without associated planing facilities); independent planing mills; wood treating plants; miscellaneous mills; and pulp, paper, and fiberboard mills.

During the period 1980-85, the total number of primary wood processing plants in Manitoba declined from 197 to 176 (Fig. 14). This decline is attributable to 1) the recession of 1981-82 and a corresponding drop-off in economic activity; and 2) some restructuring within the industry. There has been some growth since early 1983, but output by Manitoba's primary wood-using industry has not yet recovered to pre-recession levels. Detailed descriptions of the status and changes within each industry group follow.

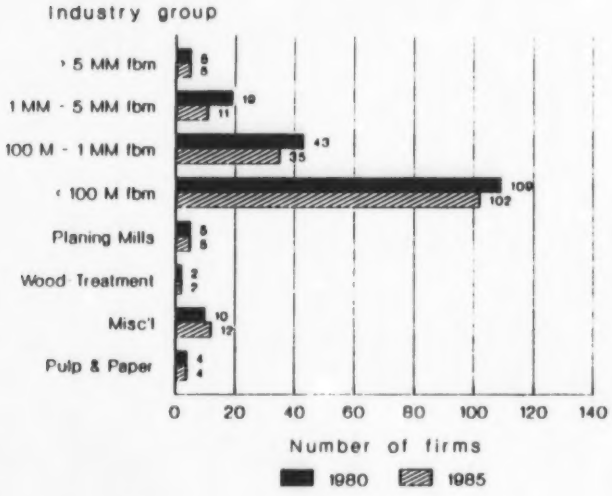


Figure 14. Changes in the number of firms by industry group, 1980–85.

Sawmills

There were 153 mills producing over 115 million fbm of lumber products in Manitoba's sawmill industry in 1985. Production within this industry group was not evenly distributed and reflected the wide range of technologies applied in the manufacture of lumber. Consequently, this group was subdivided to describe more accurately variation within the sawmill industry. Large sawmills refer to mills producing greater than 5 million (MM) fbm per year. The medium sawmill category refers to mills producing between 1 MM and 5 MM fbm per year. Small sawmills refer to mills in the 100 thousand (M) to 1 MM fbm per year class.

The sawmill industry was significantly affected by the 1981-82 recession. Since the last survey of 1980, the number of sawmills declined by 13%, dropping from 176 to 153 in number, while production declined by 14% (Table 5). The reduction in sawmill numbers was concentrated in the medium sawmill category.

One explanation for this reduction is that the medium-sized mills were not as efficient as the more competitive sawmills in the small and large categories. Generally, the small sawmills had lower unit costs. The low prices for roundwood, overhead, and capital costs allowed them to operate at a profit even during periods of low prices. As well, these small mills operated within a different market niche, avoiding direct competition with larger operations. Large sawmills employed advanced sawing technology and were more efficient processors of roundwood. Generally, these larger mills are well-established in the forest industry and are in a strong position to weather cyclic market fluctuations.

An informative characteristic of an industry is its concentration of production.[6] The Manitoba sawmill industry was very concentrated in 1985. The largest five sawmills (3% of the total mills in the province) produced 68% of all sawn products (Table 6). Although large sawmills are generally responsible for the bulk of production, smaller mills play an important role in local economies by: 1) generating primary and supplementary income for full-and part-time independent operators; 2) providing a source of low-cost building materials in local economies; and 3) utilizing small, isolated tracts of timber that are uneconomical for larger operators.

Since 1980, there has been a trend in Manitoba toward the integration of planing facilities with small sawmills (Fig. 15). This suggests that the smaller sawmills, which typically produce for local markets, are responding to local demands for finished sawn products by integrating planing facilities into their operations.

Type of ownership varies by sawmill size category (Fig. 16). Ownership of the larger mills was primarily

[6] For the purpose of this report, concentration of production is reported by sawmill size category.

Table 5. Changes in the Manitoba sawmill industry, 1980–85

Sawmill size category (fbm)	Number of firms		Percent change	Production (M fbm)		Percent change
	1980	1985		1980	1985	
Greater than 5 MM	5	5	0	85 315	78 479	-8
1 MM - 5 MM	19	11	-42	32 081	19 750	-38
100 M - 1 MM	43	35	-19	14 510	14 357	-1
Less than 100 M	109	102	-6	3 000	3 300	10
Total	176	153	-13	134 906	115 886	-14

Table 6. Concentration of production in Manitoba's sawmill industry, 1985

Sawmill size category	Number of mills	Cumulative number of mills	Cumulative percent of mills	Percent of total production	Cumulative percent of total production
Greater than 5 MM fbm	5	5	3	68	68
1 MM - 5 MM fbm	11	16	10	17	85
100 M - 1 MM fbm	35	51	33	12	97
Less than 100 M fbm	102	153	100	3	100

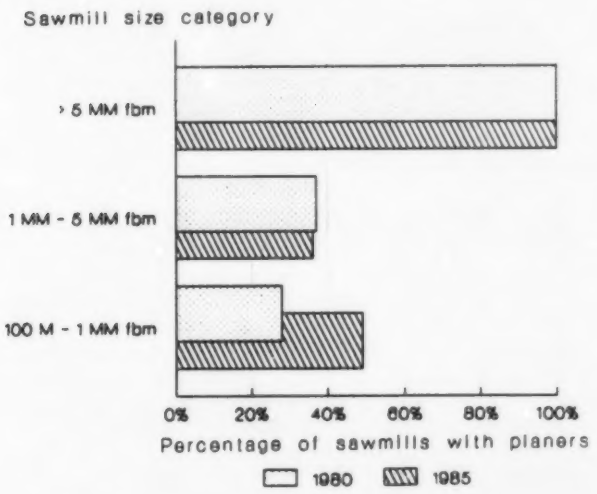
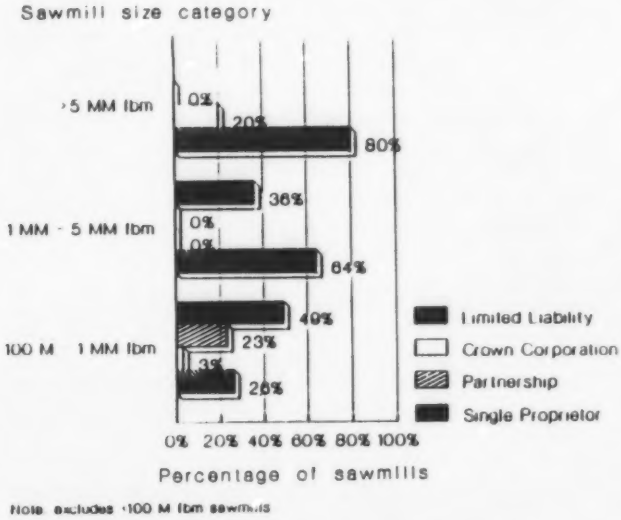


Figure 15. Changes in the proportion of sawmills with associated planing facilities, 1980–85.



Note: excludes <100 M fbm sawmills

Figure 16. Sawmill ownership patterns in Manitoba, 1985.

vested in limited liability corporations; however, one crown corporation, Manitoba Forest Resources Ltd. (Manfor), and several single proprietorships also existed. The small mills tend to be held as single proprietorships, which is a reflection of the small scale of their operation.

Independent Planing Mills

Five independent planing mills were in operation in 1985 and total production for this industry group was over 38 million fbm. Since 1980, the number of independent planing mills has remained the same; however, production has increased by 136%, an increase

of 18.7% per year. Growth in this industry group was the result of expansion of existing mills and the replacement of two smaller mills with larger, more efficient operations. All independent planing mills were held as limited liability corporations in 1985.

Wood Treating Plants

Only two wood preservation plants operated in Manitoba in 1985. One of these plants, Roblin Forest Products, was integrated with a sawmill; the other, Prendiville Wood Preservers, produced treated products only. Both plants used chromated copper arsenate (CCA) in a pressure-treatment system to manufacture their products. Both firms are limited liability corporations.

Miscellaneous Wood-using Industries

The total number of firms in this industry group increased from 10 in 1980 to 12 in 1985. A variety of products were manufactured by this group including building timbers (eight plants), untreated posts and poles (three plants), and hog fuel (one plant). Pallet plants were not included in this survey as they were considered a secondary wood-using industry.

The number of building timber plants increased since 1980 from 5 to 8. Production over the 5-year period, however, declined by approximately 20%. Individual firms provided a variety of products and services, ranging from the manufacture of building timbers to the design and construction of log homes.

The number of untreated post and pole plants declined from 5 to 3 during the 1980-85 period. Production over this time, however, increased threefold due largely to the establishment of Bel-Log Industries Ltd. This firm produced 90% of all untreated posts and poles in the province in 1985.

A new firm in this industry group is Canadian Fibre-Fuel Inc., a manufacturer of hog fuel. This firm produces wood chips on site from standing trees. The product is marketed within Manitoba as an alternate energy source. Production in 1985 was 17 500 m^3 of hog fuel.

Pulp, Paper, and Fiberboard Mills

The pulp, paper, and fiberboard industry group is the most important component of Manitoba's primary wood-using industry. This industry group is composed of a newsprint mill, an unbleached kraft pulp and paper mill, a construction grade paper mill, and a fiberboard plant.

Abitibi-Price Inc. at Pine Falls is the province's largest plant with 1985 production equal to 165 000 tonnes of newsprint — an increase of 5400 tonnes over 1980 production. This mill, which began operation in 1928, remains the oldest forest products company in the prairie provinces (Ondro and Williamson 1984). Their equipment, however, is far more modern.

The Manfor kraft mill at The Pas is the second-largest mill in the province. Production in 1985 was 107 000 tonnes, down almost 19% from the 1980 production level. Unbleached kraft paper, used in the manufacture of brown paper grocery bags, is the mill's primary product. At Gateway Industries Ltd. of Winnipeg,[7] approximately 9000 tonnes of roofing felt were produced in 1985, a drop in production since 1980 of 80%. This decline is partially attributable to a drop in building activity during the recessionary years of 1980-83. In 1980 the plant was owned by Building Products of Canada.

The final firm in this industry group is Welclad Industries of Canada Ltd. This mill, located in Winnipeg, manufactures fiberboard panel products used primarily as exterior sheathing and roof insulation. Production for 1985 was 2.55 million m^2 (10 mm basis) of insulation and fiberboard materials.

Ownership within this industry group is mostly in the form of limited liability corporations; however, one firm, Manfor, is a crown corporation.

Industry Integration

Three forms of industrial integration occur within the primary wood-using industry. The first, vertical integration, refers to the degree to which a firm performs successive phases of a manufacturing process. For example, a vertically integrated firm would harvest trees, process the roundwood, and package and market the product. To ensure a stable supply of raw materials, most large mills, especially those with high start-up and shutdown costs, are vertically integrated back to the harvesting operation (Table 7). Vertically integrated firms, with access to both raw materials and financial resources, are generally better able to withstand competitive pressures within the marketplace. Thus, the extent of vertical integration within an industry can be a qualitative measure of competitive ability.

[7] The mill was leased to Domtar in 1987.

Table 7. Vertical integration in Manitoba's primary wood-using industry, 1985[a]

Industry group	Number of mills				
	Logging sawing and planing	Logging and sawing	Sawing and planing	Sawing only	Total
Sawmills					
5MM fbm and over	5	0	0	0	5
1 MM - 5 MM fbm	3	5	1	2	11
100 M - 1 MM fbm	17	18	0	0	35
Total	25	23	1	2	51
	Logging sawing and preserving	Logging and preserving	Sawing and preserving	Preserving only	Total
Wood preservation plants	1	1	0	0	2
	Logging and processing		Processing only		Total
Miscellaneous wood-using plants					
Building timber		3	5		8
Untreated posts and poles		3	0		3
Hog fuel		1	0		1
Total		7	5		12
	Logging and processing		Processing only		Total
Pulp, paper, and fiberboard mills		3	1		4

[a] Many of the firms considered to be vertically integrated (with respect to logging) utilized contractors for part or all of their logging operations.

Horizontally integrated firms are multiplant ventures that own and manage a number of geographically distinct plants, each manufacturing the same product line (Ondro and Williamson 1984). In Manitoba, two firms are considered horizontally integrated. These firms are South-East Forest Products Ltd., with sawmills in Blumenort, Sprague, and Swan River, and Spruce Products Ltd., with sawmills at Atikameg Lake and Swan River.

A conglomerate is a widely diversified enterprise composed of a number of independent plants, each producing separate and distinct products. As an example, a forestry conglomerate could include a combination of a pulp mill, a sawmill, and a wood preserving plant. Two separate enterprises in Manitoba are recognized as conglomerates. The first, Manfor, maintains a sawmill and kraft paper mill complex at The Pas. The second conglomerate, Roblin Forest Products Ltd., operates a sawmill and wood treating plant in Roblin.

Regional Distribution of Manitoba's Primary Wood-using Industry

Manitoba's primary wood-using industry is concentrated in five forest sections: Aspen Parkland, Pineland, Mountain, Saskatchewan River, and Interlake (Fig. 17 and Tables 8 and 9). These sections share two important characteristics: they each contain a forest resource capable of supporting the industry on a fairly large scale,[a] and they each possess a well-developed transportation network. Lack of transportation infrastructure is a major reason why the forest sections of Churchill River, Hayes River, and Nelson River lack any significant forest sector development. Some road development, however, is now occurring in the Nelson River section. This should attract increased activity in future years.

[a] Aspen Parkland is an exception; this section does not have significant quantities of available softwood fiber. Plants in the Aspen Parkland Forest Section import a high proportion of fiber from neighboring sections.

Table 8. Distribution of Manitoba's primary wood-using industry by forest section and industry group, 1985

Industry group	Aspen Parkland	Pineland	Mountain	Interlake	Lake Winnipeg	Saskatchewan River	Hayes River	High Rock	Nelson River	Churchill River
Sawmills										
Greater than 5 MM fbm	0	1	2	0	0	2	0	0	0	0
1 MM - 5 MM fbm	2	3	4	1	1	0	0	0	0	0
100 M - 1 MM fbm	0	12	8	9	2	1	0	2	1	0
Less than 100 M fbm	16	12	30	34	1	4	1	0	4	0
Independent planing mills	5	0	0	0	0	0	0	0	0	0
Wood treating plants	1	0	1	0	0	0	0	0	0	0
Miscellaneous mills	2	2	6	1	0	1	0	0	0	0
Pulp, paper, and fiberboard mills	2	1	0	0	0	1	0	0	0	0
Total	28	31	51	45	4	9	1	2	5	0

Table 9. Primary wood-using industry output by product type and forest section, 1985[a]

	Forest Section									
Product	Aspen Parkland	Pineland	Mountain	Interlake	Lake Winnipeg	Saskatchewan River	Hayes River	High Rock	Nelson River	Churchill River
Dimension lumber — M fbm	25 120	10 761	21 008	3 839	1 286	52 232	0	362	350	0
Boards — M fbm	14 680	2 722	5 150	232	296	1 927	0	62	50	0
Timbers — M fbm	1 210	4 014	798	275	329	2 140	0	225	100	0
Ties (unpreserved) — M fbm	40	382	630	32	283	350	0	0	0	0
Preserved lumber — M fbm	4 000	0	250	0	0	0	0	0	0	0
House logs — m^3	0	0	1 164	425	0	1 154	0	0	0	0
Preserved posts and poles — m^3	10 820	0	5 970	0	0	0	0	0	0	0
Wood chips	0	7 700	8 300	0	0	59 640	0	0	0	0
Preserved plywood — '000 m^2	84	0	0	0	0	0	0	0	0	0
Insulation and fiberboard — '000 m^2 (10 mm basis)	2 550	0	0	0	0	0	0	0	0	0
Pulp and paper — t	0	0	0	0	0	107 400	0	0	0	0
Newsprint — t	0	165 000	0	0	0	0	0	0	0	0
Paper and Roofing products — t	9 090	0	0	0	0	0	0	0	0	0

[a] Not including the 3300 M fbm produced by sawmills in the less than 100 M fbm site class.

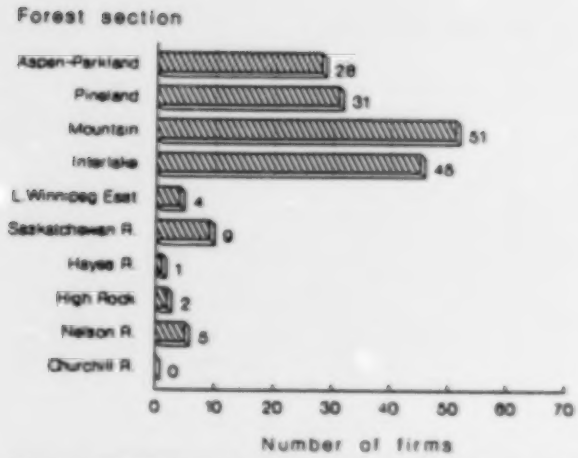


Figure 17. Regional distribution of Manitoba's primary wood-using industry, 1985.

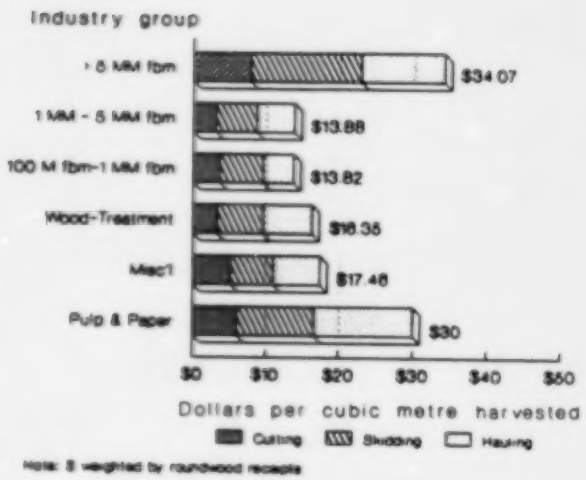


Figure 19. Average roundwood procurement costs by industry group, 1985.

Timber Harvesting

Over nine-tenths of all roundwood used by Manitoba's primary wood-using industry was comprised of spruce and pine in the following amounts: white spruce 35.4%, black spruce 23.2%, and jack pine 32.2% (Fig. 18). Aspen/poplar accounted for 7.5% of the provincial harvest.

In Manitoba, the majority of timber is harvested using the conventional cut and skid logging system. This involves manual felling and de-limbing using chain saws; transport to a landing by wheeled skidder; and either mechanical processing into short wood and transport to the mill or direct transport to the mill of tree-length material. Mechanized harvesting systems are employed at some locations in the province.

Average procurement costs in Manitoba were $29.09 per m³ of roundwood in 1985 (Fig. 19). This cost can be broken down to $6.30 per m³ for cutting, $11.25 per m³ for skidding, and $11.54 per m³ for hauling. Average procurement costs ranged from a low of $13.82 per m³ for small sawmills to a high of $34.07 per m³ for large sawmills. The smaller sawmills enjoyed lower costs mainly because of shorter haul distances due to the use of portable sawmills operated at or near the logging site.

Roundwood was transported to mills by truck, rail, barge, and/or skidder, with trucking accounting for 83% of all roundwood shipped within the province (Fig. 20). Average transport distance for the forest industry was 166 km (Fig. 21) though there was great variability among mills, with distances ranging from less than 1 km (where skidders were used to deliver roundwood to portable sawmills) to over 360 km. Over such long distances, rail transport becomes cost-effective, and in 1985, almost 10% of Manitoba's roundwood was shipped by rail.

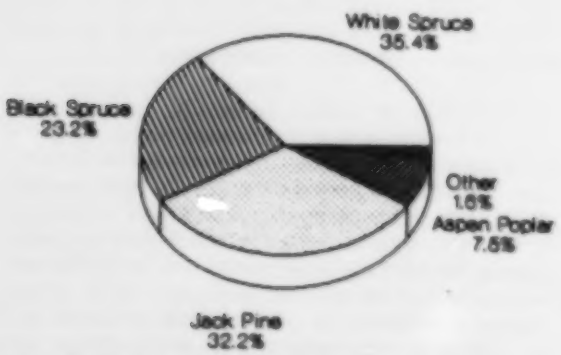


Figure 18. Species distribution of roundwood inputs by volume, 1985.

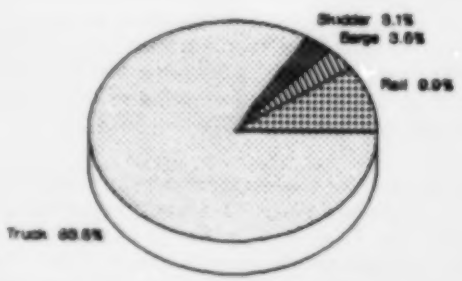


Figure 20. Roundwood shipping methods used by primary wood-using industries by volume, 1985.

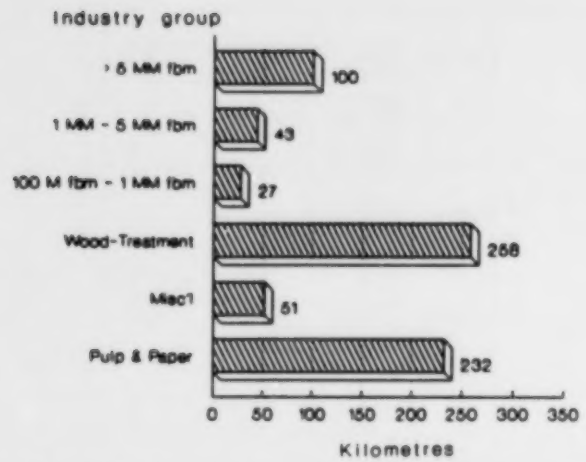


Figure 21. Average roundwood haul distance by primary wood-using industry group, 1985.

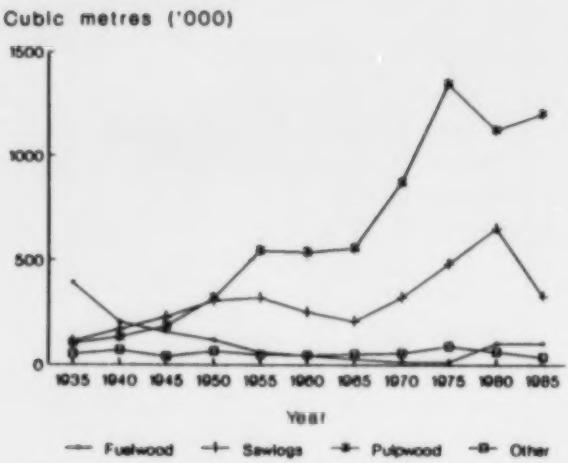


Figure 22. Utilization trends in Manitoba's primary wood-using industry, 1935–85. (Source: Manitoba Natural Resources, Economics and Program Review Section.)

Barges are used where water transport is a feasible and cost-effective alternative to conventional truck or rail transport. One firm, Abitibi-Price Inc., shipped a portion of its roundwood by barge. Trees were harvested, processed, and transported to an accumulation yard over the winter months. In the summer, this wood was loaded onto barges and transported to the mill's inventory, where it was stored for future processing.

Trends in Utilization

Roundwood in Manitoba is harvested in the form of sawlogs, pulpwood, and fuelwood. There have been significant shifts in roundwood harvests (Fig. 22) over the past 50 years. The following sections discuss utilization trends for specific roundwood products.

Fuelwood

In 1935, fuelwood was Manitoba's main forest product, accounting for 59% of the total roundwood harvest from crown land. With the availability of cheaper and more efficient fuels such as natural gas, fuel oils, and hydroelectricity, the demand for fuelwood dropped to a low of 14 268 m^3 in 1974-75.

The demand for fuelwood began to increase significantly in the late 1970s. This was due to three principal factors. First, in response to buyers' demands, home builders constructed a higher number of dwellings with fireplaces. Second, prices for conventional sources of energy reached all-time highs. Third, improved designs in wood-burning stoves significantly increased their burning efficiency. In response to these influences, fuelwood harvests increased to 103 715 m^3 in 1982-83 and have fluctuated between 100 000 m^3 and 110 000 m^3 throughout the early 1980s. The recent declines in energy prices could dampen the rate of increase in fuelwood harvesting.

Sawlogs

Sawlog harvests fluctuate in response to both demand and supply factors. In the short run, demand factors are the primary determinants of harvest levels. For example, sawlog harvests increased dramatically during the war years and again in the late 1970s, both periods of high lumber demand.

Over the long run, supply factors play a more important role in determining harvest levels. Expressed as a percentage of total provincial harvest, sawlog removals are declining. In fact, localized shortages (i.e., Mountain and Pineland forest sections) of quality sawlog material have emerged and threaten to constrain future sawlog harvests in some areas.

A breakdown of sawlog harvest by species group (i.e., softwood versus hardwood) points to a real increase in the volume of hardwood material harvested over the 1935-85 period (Fig. 23). In 1935, approximately 18% of all sawlogs harvested were hardwoods; in 1985, this value increased to 24%. Future hardwood sawlog harvests are expected to rise as quality softwood sawlogs become increasingly scarce, technological advancements develop new products with suitable structural characteristics, and building codes develop to accommodate the use of hardwood components.

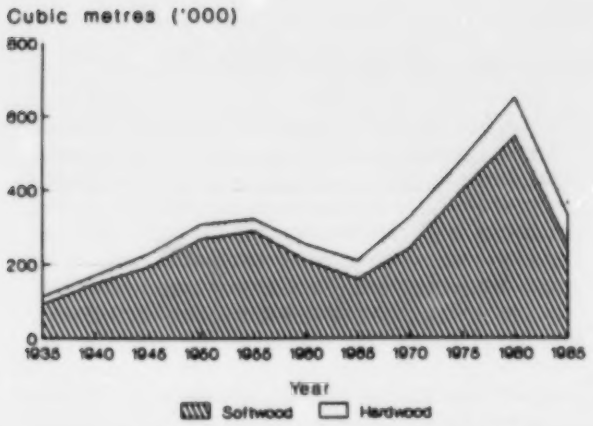


Figure 23. Trends in species distribution of saw-log harvests, 1935–85. (Source: Manitoba Natural Resources, Economics and Program Review Section.)

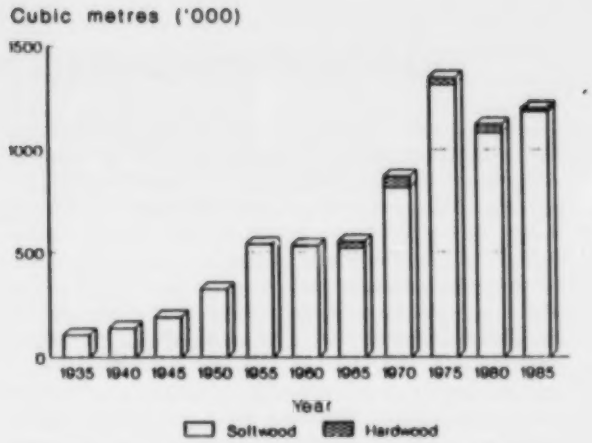


Figure 24. Trends in pulpwood production, 1935–85. (Source: Manitoba Natural Resources, Economics and Program Review Section.)

Pulpwood

Pulpwood harvests have risen steadily from 102 833 m^3 in 1935 to 1 201 970 m^3 in 1985 — an average annual increase of 5%. Pulpwood was the predominant component of Manitoba's annual roundwood harvest, accounting for over 74% of the total harvested in 1985.[9] The majority of pulpwood was softwood and was used in the manufacture of newsprint and kraft pulp and paper (Fig. 24). The small hardwood component was used by the province's two fiberboard mills.

[9] The 1985 pulpwood harvest was slightly greater than normal because the Manfor integrated sawmill-paper mill complex assigned a greater portion of its roundwood inputs to the manufacture of pulp and paper due to the sawmill shutdown for refit.

CHAPTER IV

MANITOBA'S PERFORMANCE WITHIN THE CANADIAN CONTEXT

Canada is the world's leading exporting nation of forest products accounting for 22.7% of total world exports in 1984 (Canadian Forestry Service 1987). To achieve this dominant position, Canada's forest industry has relied on a plentiful supply of old-growth forest, inexpensive energy, a trained and experienced work force, access to specialized technical, engineering, managerial, and marketing expertise, and a long-standing tradition in forest products manufacturing.

Several recent developments, however, have the potential to change the Canadian position as a world forestry leader. First, the high productivity of the land base and low cost of labor in developing countries have led to expectations that nontraditional producers will account for increasingly larger shares of world forest products trade in the future. Tehnological advances in the utilization of tropical and temperate-zone hardwoods for pulp manufacturing, and the probability of subsidized pulp and paper production for exports (Mullinder 1987) are expected to change these regions from importers of forest products to competitive exporters. Second, increased concern for environmental protection may result in more restrictions, higher costs, and greater regulation of production methods (Mullinder 1987). Third, the demand for primary forest products may continue to be adversely affected by nonfiber-based substitute products made of plastics, metals, and other products. Fourth, the use of secondary (recycled) fibers may continue to increase. Fifth, the supply of readily available, old growth, softwood timber may be approaching its limits in Canada. Sixth, economic power is shifting away from the North American continent to other parts of the globe.

As a result of these developments, Canadian, and particularly Manitoban, producers will be subjected to heightened competitive pressures on traditional product lines. There are, however, alternatives. Technological innovations in the areas of pulping, bleaching, papermaking, composite wood products, and solid wood products offer potential development opportunities for the Canadian industry. Technology also offers similar opportunities to the area of secondary manufacturing. Mullinder (1987) states: "The prime ingredient of products in the years ahead will be knowledge content rather than material, and productivity will be measured in terms of value-added rather than tonnes of production." The president of the Pulp and Paper Research Institute of Canada, P. Wrist, is quoted by Mullinder (1987) as noting that: "The industry is in a period of transition. It will emerge, as it has done before on similar previous occasions, structurally changed in its primary raw materials, its manufacturing processes, and in its major product lines. There are strong reasons for optimism that the transition will lead to further expansion of the industry."

As mentioned, Canada is the leading forest products exporting nation in the world. Each of the 10 provinces contributes to the nation's positive balance of trade in forest products and, in a sense, the provinces compete with each other for market share. An assessment of the competitive ability of Manitoba producers compared to other provinces therefore provides a basis for evaluating the status of the Manitoba forest industry.[10] Labor productivity, capital productivity, and average variable costs are useful measures for comparative purposes.

Labor and Capital Productivity

An analysis of interprovincial differences in factor productivities (i.e., labor productivity, capital productivity) contributes to the evaluation of Manitoba's competitiveness because sector efficiency is directly related to productivity. Some qualification is required. Although productivity is related to competitiveness, it is not the sole determining factor. A host of other factors, including taxes, environmental regulations, product quality control, distance to markets, and transportation infrastructure, also influence competitiveness. Also, measures of productivity should not be viewed in isolation. For example, even though a particular region may have a low labor productivity rate, if its wages are also low, there may be no net effect on competitiveness. It is also difficult to identify the reasons for differences in productivity. For example, a particular labor productivity rate will be influenced by the ratio of capital to labor, current technologies employed, the education, training, and experience of the worker, scale of the operation, and efficiency of management.

Gross Domestic Product (GDP) at factor cost, in constant prices per employee or employee-hour worked, is one approach to measuring labor productivity (Dobie 1985). Figure 25 illustrates that in 1983,

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[10] This approach is useful for general comparisons only. Differences in product lines among provinces at the two-digit SIC level can result in some anomalies.

Manitoba wood industries ranked fifth out of nine provinces in labor productivity. Statistics on GDP at factor cost are not available for the paper and allied industries. Alternatively, value added for goods of own manufacture (expressed in current dollars) and associated person-hours paid were used to construct a measure of labor productivity. Of the seven provinces for which data are available, Manitoba's paper and allied industry ranked sixth in 1984 (Fig. 26).

Generally, capital productivity is measured in terms of output per unit input of capital. A lack of data on capital stocks by industry and province, however, precludes the calculation of a standard capital productivity value. Therefore, capital productivity was measured by VAMP — Value Added Minus Payrolls per worker hour. Maki et al. (1985) suggest that this approach is necessary to adjust for wide differences in payrolls among regions or sectors. In this context, VAMP represents the payments to capital, and thus serves as a relative measure of capital productivity among provinces. The wood industries of Manitoba generated $9.31 VAMP per person-hour, ranking sixth out of ten in capital productivity (Fig. 27). Of the seven provinces for which data are available, Manitoba's paper and allied industries ranked sixth in capital productivity (Fig. 28). When compared with the national average (which includes nine pulp and paper producing provinces), however, the capital productivity of Manitoba's industry is roughly equal

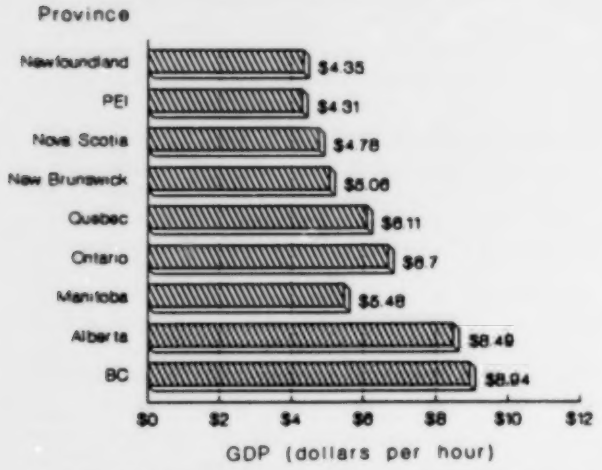


Figure 25. Labor productivity in Canada's wood industries, 1983. (Source: Statistics Canada 1985.)

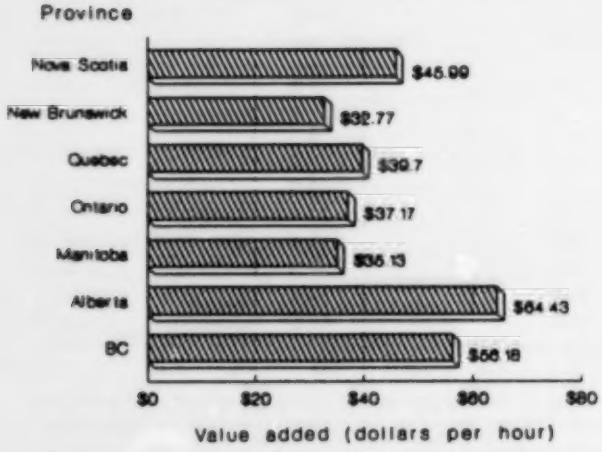


Figure 26. Labor productivity in Canada's paper and allied industries, 1984. (Source: Statistics Canada 1986b.)

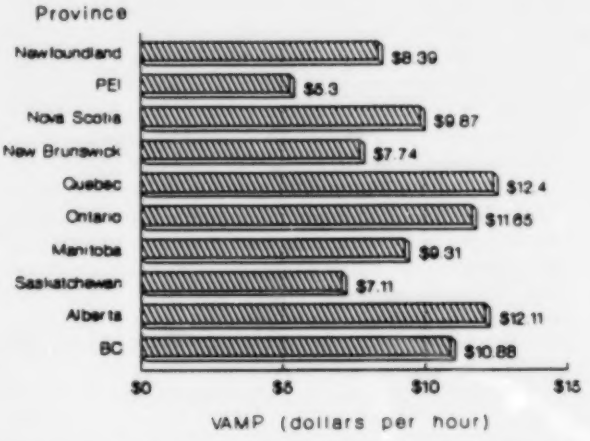


Figure 27. Capital productivity in Canada's wood industries, 1984. (Source: Statistics Canada 1986b.)

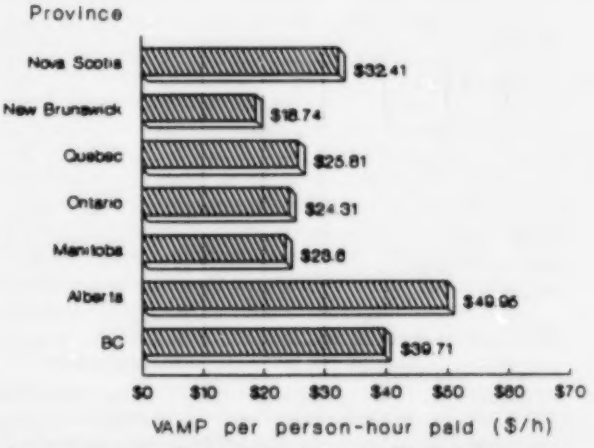


Figure 28. Capital productivity in Canada's paper and allied industries, 1984. (Source: Statistics Canada 1986b.)

to the national mean. In fact, the fourth, fifth and sixth positions (Quebec, Ontario, and Manitoba) are almost indistinguishable.

The comparisons of labor and capital productivity measures for wood and paper and allied industries by provinces show that Manitoba mills were performing at between average and slightly below average levels in 1985. Alberta, B.C., Ontario, and Quebec consistently outperformed Manitoba's wood industries, and Alberta, B.C. and Nova Scotia were superior in the paper and allied sector. Manitoba, Quebec, and Ontario were roughly equal in terms of capital and labor productivity in the paper and allied sectors.

The analysis provided in Figures 26-28 is general, though the information does lead to a number of broad inferences regarding Manitoba's forestry situation. First, the physical productivity (i.e., physical output per unit of input) of Manitoba mills ranged from between average to below average. This is likely due to small scales of operation and the use of older technologies in production.[11] Second, low volumes per hectare (Table 10) and small-diameter trees led to low product recovery rates and high delivered wood costs. Third, due to lower labor rates, Manitoba mills were more labor-intensive than plants in Alberta and B.C. And fourth, the final value of the wood products mix for Manitoba mills could have been lower than the value of wood industry products in Alberta, B.C., Ontario, and Quebec and of paper and allied products in Alberta, B.C., and Nova Scotia.

Average Variable Costs

Costs of production are another important determinant of competitive ability. Although competitive ability is difficult to measure directly, it is possible to determine the relative efficiency of forest products manufacturing among provinces. One such measure is average variable cost, that is, total variable cost divided by output.

Statistics Canada reports variable cost information in three categories (wages and salaries, fuel and electricity, and materials and supplies) for each province by the two-digit SIC code. A lack of detailed output data and a lack of homogeneity among forest products, however, necessitated the use of value of shipments of own manufacture as an indicator of output. As a result, average variable cost is measured in terms of total variable cost per dollar of final product.

The competitive ability of the forestry sector is partly dependent upon an efficient logging industry. Numerous studies (F.L.C. Reed and Associates 1973; Teskey and Smyth 1975; Sandwell Consultants 1977; Department of Industry, Trade and Commerce 1978; Ontario Ministry of Natural Resources 1981; Ondro and Williamson 1984) have identified delivered wood costs as the largest single cost component in the manufacture of forest products. Consequently, the efficiency of logging operations has a direct impact upon downstream manufacturing activities.

Table 10. Area, volume, and stand density on inventoried, stocked, productive, nonreserved forest land by province, 1981. (Source: Bonnor 1982.)

Province	Volume ('000 000 m³)	Area ('000 000 ha)	Stand density (m³/ha)
Newfoundland	463	7.9	58.6
P.E.I.	33	-[a]	-[a]
Nova Scotia	202	2.8	72.1
New Brunswick	516	5.9	87.5
Quebec	4133	48.9	84.5
Ontario	3198	33.1	96.6
Manitoba	635	11.8	53.8[b]
Saskatchewan	484	7.4	65.4
Alberta	1438	13.3	108.1
B.C.	7842	41.3	189.9

[a] Dash indicates information not available.

[b] Based on 1986 inventory data and including all ownerships and reserved and nonreserved land categories, the average volume per hectare on stocked lands in Manitoba is 56 m³/ha (745 624 740 m³ per 13 295 898 ha). This does not include volumes in the regeneration (unproven), regeneration (proven), and immature maturity classes.

[11] The Manfor sawmill is an exception; it was entirely rebuilt in 1984 using state-of-the-art sawmill technology.

Average variable costs in Manitoba's logging industry equaled approximately 85% of the total value of shipments, a value 5% higher than the Canadian average (Fig. 29). Below-average wages and energy costs were offset by substantially higher expenditures for materials and supplies. This higher-than-average level of expenditure reflects wood purchases and payments to contractors by Manfor and Abitibi Price Inc.

Manitoba's wood industries enjoy a slight cost advantage as total variable costs accounted for $0.79 for every dollar of shipments (Fig. 30). This was the fourth-lowest in Canada, behind Nova Scotia, Quebec, and Ontario. Plentiful hydroelectric resources resulting in reduced energy expenses contributed to the cost advantage enjoyed by this industry.

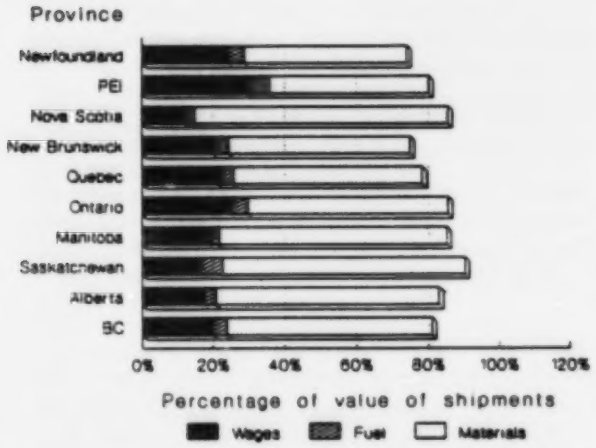


Figure 29. Average variable costs in the logging industry by province, 1984. (Source: Statistics Canada 1986a.)

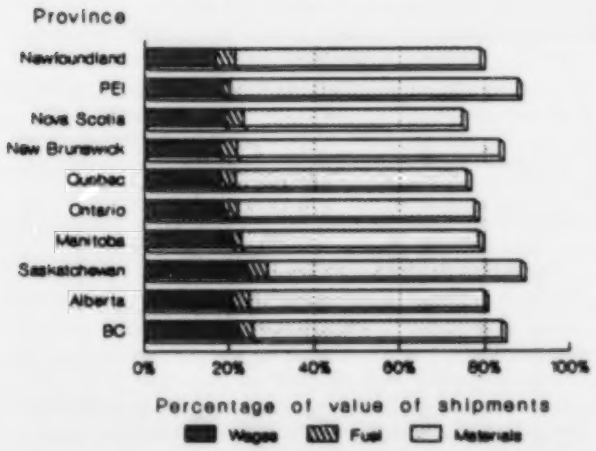


Figure 30. Average variable costs in Canadian wood industries, 1984. (Source: Statistics Canada 1986b.)

Average variable cost of Manitoba's paper and allied industries was fifth out of the seven provinces for which data were disclosed (Fig. 31). Average variable cost equaled $0.73 for each dollar of sales. When compared to the Canadian average (which included all nine pulp and paper producing provinces), Manitoba's paper and allied industries performed on par. Once again, the comparatively high cost of materials and supplies nullified any competitive edge realized in the areas of wages and energy.

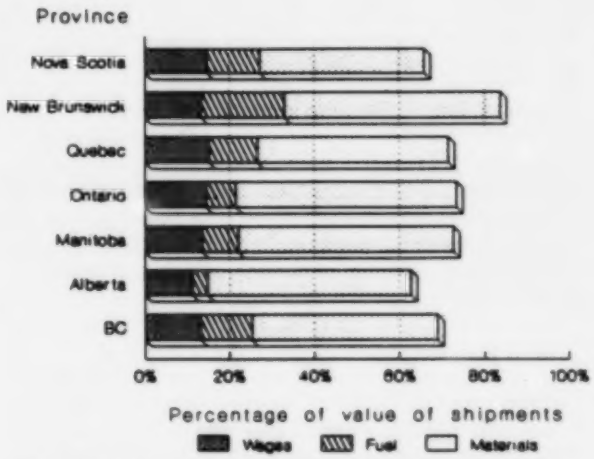


Figure 31. Average variable costs in Canadian paper and allied industries, 1984. (Source: Statistics Canada 1986b.)

Competitive Ability

In comparison to other provinces, Manitoba producers generally had lower productivity and higher average variable costs in 1985. This does not mean that Manitoba producers were uncompetitive, but that the Manitoba sector was more vulnerable to short-term cyclical price shifts and longer-term structural shifts in markets and products. This emphasizes the point that in the future, the forest industry in Manitoba will have to be responsive and adapt to changing circumstances in the global forest sector. Changing product lines, newly developed production methods, and shifting markets can be viewed as either constraints or opportunities to forest sector development in Manitoba. The challenge will be to pursue an industry mix that realistically reflects the Manitoba situation. Positive aspects to consider include low labor costs, low energy costs, close proximity to major U.S. markets, and close proximity to major suppliers of raw materials, equipment, and supplies. Negative aspects to consider include declining availability of softwood sawtimber stands and low volumes per hectare and high wood costs.

CHAPTER V

TECHNOLOGY IN MANITOBA'S PRIMARY WOOD-USING INDUSTRY

Forintek Canada Corp. was consulted to provide a general assessment of the technology employed by Manitoba's primary wood-using industry. Its evaluation, summarized by industry group, follows. Those individuals interested in a more-detailed description of the equipment used by Manitoba's primary wood-using industry are referred to Giles and Bohning (1986).

Sawmills

Greater than 5 MM fbm Annual Production

The five mills in this industry group produced between 6 million fbm and 49 million fbm in 1985 for a total production of 78.5 million fbm. The 1985 distribution of equipment for each of the five mills is compared with that given in an industry survey conducted in 1980 (Table 11). The technology employed within this group ranged from the most modern (Manfor) to more standard technology in the other four mills. In 1984 the largest mill (Manfor) was completely rebuilt using the most current technology. Here, logs are scanned prior to processing with a scanner-computer to determine diameter, length, and a real-time optimum sawing solution. Chipping canters, edges, trimmers, kilns, and planers ensure accurate manufacturing and minimize waste. This state-of-the-art technology is designed to increase productivity and improve recovery from small-diameter roundwood inputs.

The other four mills in this industry group produced between 6 and 10 million fbm per year, each using more-traditional equipment. The technology employed by these four mills was suitable for the log diameters processed and the lumber volumes produced. In 1985, these mills were operating at 69-87% of capacity. Market conditions and local wood supply were indicated as the factors limiting expansion; equipment configuration was not a limiting factor.

1 MM to 5 MM fbm Annual Production

The 11 mills in this group produced a total of 20 million fbm in 1985. The distribution of lumber processing equipment shows that only one mill, the largest, had a debarker, a slasher unit, and a dry kiln (Table 12). All mills used circular saw headrigs for primary sawlog breakdown. The equipment used by this group was suitable for the log diameters processed and the lumber volumes produced. (If care is taken with log and board positioning, acceptable recovery can be achieved with such equipment.) Operating rates ranged from 27% to 73% of capacity; none of the mills indicated equipment as a limiting factor to expansion, but rather identified local timber supply and market fluctuations as limiting forces.

100 M to 1 MM fbm Annual Production

There were 35 mills in this category with production ranging from 100 000 to 942 000 fbm per year, for a total of 14.4 million fbm. Table 13 shows the distribution of lumber processing equipment for each of the stationary mills and portable mills of this group. All but one of the 15 stationary mills used circular saw

Table 11. Distribution and quantity of lumber processing equipment in large sawmills (5 MM fbm and over) in 1980 and 1985

	1980 mills[a]					1985 mills				
Facility	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**
Debarker	3	1	1	2	1	4	1	1	2	1
Cut-off saw	0	0	0	0	0	2	0	1	0	0
Circular headsaw	0	0	1	0	1	0	0	1	0	0
Scragg, band, quad or gang saw	1	1	2	1	1	1	1	1	1	1
Chip-N-Saw, chipping canter	2	0	0	0	0	2	0	0	0	0
Reman or resaw	0	1	0	2	1	1	1	1	2	1
Edger and trimmer	3	3	2	2	2	5	3	2	2	2
Chipper	2	1	0	1	1	1	1	1	1	1
Chipping edger	2	0	0	0	0	1	0	0	0	0
Planer	0	1	1	1	1	1	1	1	1	1
Dry kiln	6	1	1	0	0	6	1	0	0	0

[a] Mills A through E in 1980 correspond to mills A through E in 1985.

Table 12. Distribution of lumber processing equipment in medium-sized sawmills (1 MM to 5 MM fbm), 1985

Equipment	Mill										
	A	B	C	E	D	F	G	H	I	J	K
Debarker	0	0	0	0	0	0	1	0	0	0	0
Cut-off saw	0	0	0	0	0	0	1	0	0	0	0
Circular headsaw	1	1	1	2	1	1	1	1	2	1	1
Scragg, band, quad or gang saw	0	0	0	0	1	1	2	0	0	0	0
Chip-N-Saw, chipping canter	0	0	0	0	0	0	0	0	0	0	0
Reman or resaw	0	3	0	0	0	0	0	0	0	0	0
Edger and trimmer	1	2	1	1	1	1	2	0	0	0	0
Chipper	0	0	0	0	0	0	0	0	0	0	0
Chipping edger	0	0	0	0	0	0	0	0	0	0	0
Planer	0	3	0	0	1	1	1	0	0	0	0
Dry kiln	0	0	0	0	0	0	1	0	0	0	0

Table 13. Distribution of lumber processing equipment for stationary and portable sawmills producing from 100 M to 1 MM fbm, 1985

Equipment type	Stationary sawmills	Portable sawmills
Circular carriage	14	20
Band headrig	1	0
Scrag headsaw	1	4
Edgers	10	12
Trim saws	4	2
Planers	10	7
Resaws	3	0
Dry kiln	1	0

headrig carriages (ranging from 106 to 132 cm in saw diameter) for primary log breakdown. The remaining mill used a band saw headrig. Because of the permanent nature of the stationary mills, they generally have more equipment to improve recovery. Sixty-seven percent of the stationary mills had edgers compared to 60% of the portable mills, and 27% of the stationary mills had trim saws compared to only 10% percent of the portable mills. Three of the stationary mills, but none of the portable mills, used resaws.

Equipment used in the finishing of rough sawn material was distributed as follows: 67% of the stationary mills had planers compared to only 35% of the portable mills. One stationary mill also had a dry kiln. Given the small volumes of lumber produced, equipment did not limit expansion for these mills. Although recovery was not as high as the more technically advanced facilities, these mills produced sawn products suitable for local and provincial markets. As with the previous group, the type of equipment employed was well-suited for the log diameters processed and the lumber volumes produced.

Less than 100 M fbm Annual Production

There were 102 sawmills in this size class in 1985. Based on provincial forestry records, total production was estimated to be 3.3 million fbm, with average annual production per mill equal to 32 000 fbm. Although specific information on the technology employed by these mills is unavailable, it is known that over 70% of these small sawmills produced less than 50 000 fbm per year. Given the probable objectives of the owners, which may be to generate supplemental income and/or manufacture lumber for personal use (Ondro and Williamson 1984), the level of technology employed by these mills is appropriate.

Independent Planing Mills

There are five independent planing mills in Manitoba that produced between 4.8 million and 12.5 million fbm in 1985. All mills used resaws and trim saws. Two of the mills had dry kilns, including a dehumidifier, one of the first such kilns installed in western Canada.

Market conditions and wood supply, rather than designed capacity, were two limitations cited for restricting expansion.

Wood Treating Plants

There were two wood preservation plants in Manitoba, one of which was integrated with a sawmill. Both plants used chromated copper arsenate in a water mix and pressure treating tanks, standard equipment in the wood preservation industry. Machine capacity was not identified as limiting future expansion.

Miscellaneous Wood-using Mills

The miscellaneous wood-using industry group comprised 12 plants that used a variety of technologies in the manufacture of their products. Among the building timber plants, two mills had sawmills (one stationary, one portable), three mills had log lathes for producing round logs, and one used a modified planer. Three operators hand-hewed their logs.

A mobile hog fuel operation produced 17 500 m^3 of wood chips per year, which were used by the Manfor pulp mill in tests for bark separation. Wood chips are currently viewed as waste by the sawmill industry, though they are a potential source of wood fiber for the pulp and paper industry. Advanced technology to separate chips from bark is being developed and could be beneficial to smaller sawmill operators who currently burn their slabs and edgings.

Pulp, Paper, and Fiberboard Mills

The four plants in this industry group were a pulp and newsprint mill, an unbleached kraft pulp and paper mill, a construction grade paper mill, and a fiberboard plant. The Abitibi-Price mill produced 165 000 tonnes per year of newsprint using mechanical (groundwood) and sulfite pulping processes. Standard technology was used with the addition of process control to enhance the uniformity and strength of the resulting product.

The Manfor kraft pulp mill at The Pas produced 107 000 tonnes of pulp and unbleached kraft paper in 1985. Manfor officials made a commitment to keep their equipment current in order to take advantage of new technology and advances in process control, resulting in the 1984 upgrading.

CHAPTER VI

PRODUCTION AND MARKETS FOR MANITOBA'S FOREST PRODUCTS

Manitoba's primary wood-using industry manufactures and markets a wide variety of products. This chapter provides a detailed summary of 1985 production and marketing statistics by industry group.

Sawmills and Indopendent Planing Mills

Due to the similarity of their output, production statistics for the sawmill and independent planing mill industries are presented together. These two industries produce four distinct types of wood products: dimension lumber, board lumber, timbers, and wood chips. Sawn products are categoried by thickness; timbers, dimension lumber, and board lumber have thicknesses of 3 in. or greater, 2-3 in., and 1-2 in., respectively. Wood chips are a by-product of the lumber manufacturing process, and are produced during primary breakdown of roundwood inputs. They are a potential source of wood fiber for the paper and allied industries.

In 1985, Manitoba's sawmill and planing mill industry produced over 151 million board feet of sawn products (Fig. 32). This statistic excludes mills with production less than 100 000 fbm per year. Independent planing mills were responsible for approximately one-quarter of this output. Sawmills in the 5 million fbm and over size category were the major producers of dimension and board lumber, while the smaller mills produced 70% of all timbers. The small- and medium-sized sawmills in Manitoba have reduced the level of competition with large mills by targeting local and provincial markets for their products.

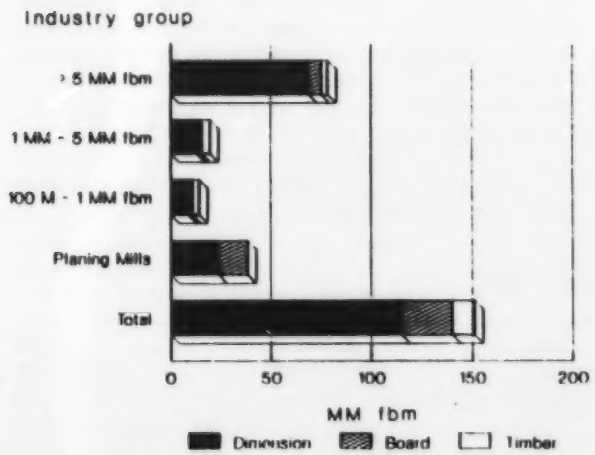
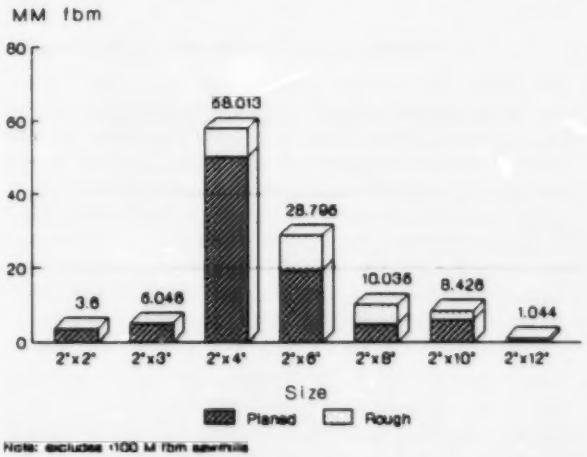


Figure 32. Manitoba lumber production by product and industry group, 1985.

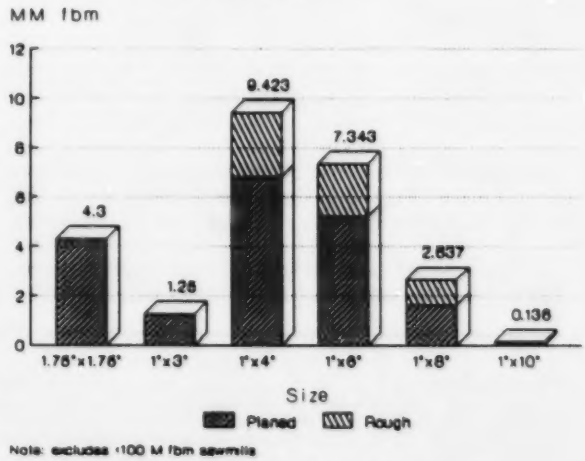
The distribution of products within lumber types shows that the standard 2 x 4 was the predominant product, accounting for 51% of all dimension lumber output (Fig. 33). Within board products, 1 x 4s and 1 x 6s accounted for 38% and 29%, respectively, of all board material (Fig. 34).

Sixty-six percent of all Manitoba lumber products were shipped to market by truck (Fig. 35), though differences existed in transportation methods among sawmills and planing mills (Fig. 36). Small- and medium-sized sawmills-planing mills relied almost exclusively on truck transport. Sawmills in the large



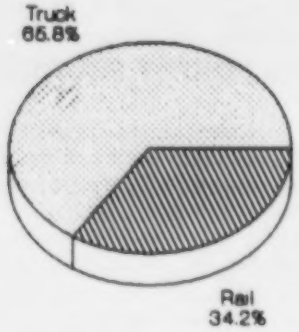
Note: excludes <100 M fbm sawmills

Figure 33. Distribution of Manitoba's dimension lumber output, 1985.



Note: excludes <100 M fbm sawmills

Figure 34. Distribution of Manitoba's board lumber output, 1985.



Note: excludes <100 M fbm sawmills

Figure 35. Transportation of lumber products by percent of total production, 1985.

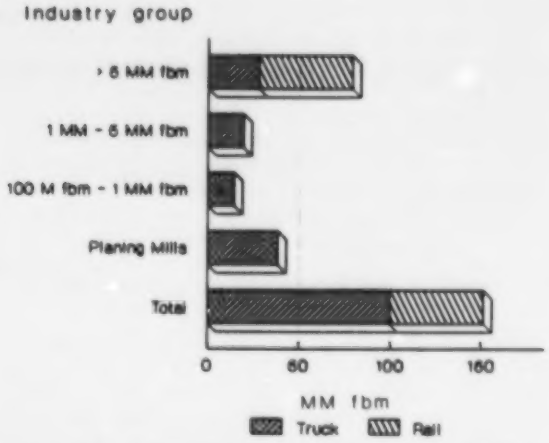


Figure 36. Transportation of lumber products by industry group, 1985.

size category, however, used rail as their main mode of transportation, shipping 64% of their total lumber production by train. There are two factors that explain the difference in transportation method. First, large sawmills generally produce sufficient quantities of lumber to fill rail cars on a regular basis. Second, output from the large mills is usually shipped to distant markets and rail transport provides a less expensive mode of transportation for longer distances (Ondro and Williamson 1984).

Wood chip production by Manitoba sawmills was 78 500 tonnes in 1985. Only the large sawmills produced sufficient quantities of chips on a regular basis to warrant the sale of this by-product. One firm, Manfor, produced 74% of all chips in the province. These chips are piped directly from the sawmill to the adjacent pulp and paper complex. In all other cases, trucks haul chips to pulp and paper mills.

Wood Treating Plants

Manitoba's two wood treating plants produced approximately 17 000 m^3 of posts and poles; 4 250 000 fbm of treated lumber; and 83 600 m^2 of preserved plywood in 1985 (Table 14). Only a small portion of this total output was custom production.

Miscellaneous Wood-using Industries

The miscellaneous wood-using group is composed of building timber plants, untreated post and pole plants, and a hog fuel plant. This industry group represents a minor component of Manitoba's primary wood-using industry. Together, the firms of this group produced 2743 m^3 of building timbers (house logs), 218 000 untreated posts, 1700 untreated poles, and 17 500 m^3 of hog fuel.

Pulp, Paper, and Fiberboard Mills

The pulp, paper, and fiberboard group is the main element of Manitoba's primary wood-using industry. Products manufactured by this group in 1985 include 2.55 million m^2 (10 mm basis) of insulation fiberboard; 107 400 tonnes of kraft pulp and paper; 165 000 tonnes of newsprint; and 9 070 tonnes of roofing felt (Table 15). On a weight basis, newsprint manufactured by Abitibi-Price Inc. accounted for 59% of the total paper-related production in Manitoba.

Table 14. Production of Manitoba's wood treating plants, 1985

Product type	Own production	Custom production	Total production
Preserved lumber — M fbm	4 250	0	4 250
Posts — m^3	10 560	300	10 860
Poles — m^3	5 690	240	5 930
Preserved plywood — '000 m^2	79.4	4.2	83.6

Table 15. Production of the pulp, paper, and fiberboard industry group, 1985

Product type	Quantity
Newsprint — t	165 000
Kraft paper, unbleached — t	93 610
Kraft pulp, unbleached — t	13 830
Roofing felt — t	9 070
Insulation board and fiberboard (10 mm basis) — m^2	2 550 000

Product Flows and Market Destinations

In 1985, Manitoba exported approximately $153 million worth of forest products. Market destinations ranged from the neighboring provinces of Saskatchewan and Ontario to the overseas markets of Europe and Pacific Rim countries. By far the most important market region for Manitoba's forest products was the midwestern United States, which received 63% or over $96 million worth of provincial forestry exports (Fig. 37). Of the total value of shipments, only $66.8 million (30%) remained within Manitoba. Market destinations varied with the types of product shipped.

Lumber Markets

Large sawmills exported 52.8% of their dimension and 27.6% of their board products to the midwestern United States (Table 16). The remainder of the output of the large sawmills remained in Canada, with the majority sold within the province.

Medium-sized sawmills relied more heavily on local and provincial markets, exporting only 15% of their dimension lumber, 16% of their board lumber, and 16% of their timbers outside the province. The largest export markets were the western provinces of Saskatchewan and Alberta; however, a small share of materials was shipped to eastern Canada and the midwestern U.S.

Small sawmills produced for essentially the same markets as the medium-sized mills. Of the total production within this size category, only 7% of the dimension lumber, 26% of the board lumber, and 15% of the timbers were sold outside the province.

The small- and medium-sized sawmills were dependent on local and provincial markets because they did not possess a marketing infrastructure and did not produce sufficient quantities of materials on a sustained basis to capture a share of export markets. Output of these mills is important in satisfying local demand for housing and light construction materials (Ondro and Williamson 1984).

Independent planing mills sold their products in approximately equal amount between provincial and export markets. This is the only industry group to ship a small amount of lumber (1% of dimension and 1% of board materials) to Europe.

Markets for Treated Wood Products

Because of limited supply and high local demand, all of the preserved posts and 66% of the preserved poles manufactured by Manitoba's wood treating plants were sold within the province (Fig. 38). Posts were used for fencing in farming areas, and poles were either purchased by utility companies or sold to farmers to be used as barn poles. Half of the preserved lumber and timber and all of the preserved plywood were marketed outside Manitoba, mainly in the U.S.

Miscellaneous Wood Products Markets

The miscellaneous wood-using group sold its products across Canada and the midwestern U.S. (Fig. 39). The majority of house logs (65.1%) was sold within Manitoba; however, 16%, 9%, and 6% were sold to eastern Canada, Saskatchewan, and the midwestern U.S., respectively.

The untreated post and pole plants sold their products in two markets. All untreated posts were sold within the province, mainly to farmers; and all untreated poles were shipped out of the province and sold in eastern Canada. Manitoba's only hog fuel plant markets its product solely within the province.

Markets for Pulp, Paper, and Fiberboard

Manitoba's pulp, paper, and fiberboard industry produced primarily for export markets in 1985 (Fig. 40). Eighty percent of the newsprint, 92% of the kraft pulp and paper, 95% of the roofing felt, and 95% of the insulation board produced in Manitoba were sold outside the province. This industry group was the largest earner of export dollars among all of Manitoba's primary wood-using industries.

Market Outlook: Constraints and Opportunities

The future of the primary wood-using industry in North America is dependent upon its ability to meet the challenges of increased competition, new product development, and world markets (Veltkamp 1986). Since 1980, disinflation and slow economic growth have brought about an excess of capacity over demand and heightened competitive pressures. Today, survival and ability to compete mean cutting costs and raising productivity (Veltkamp 1986). In recent

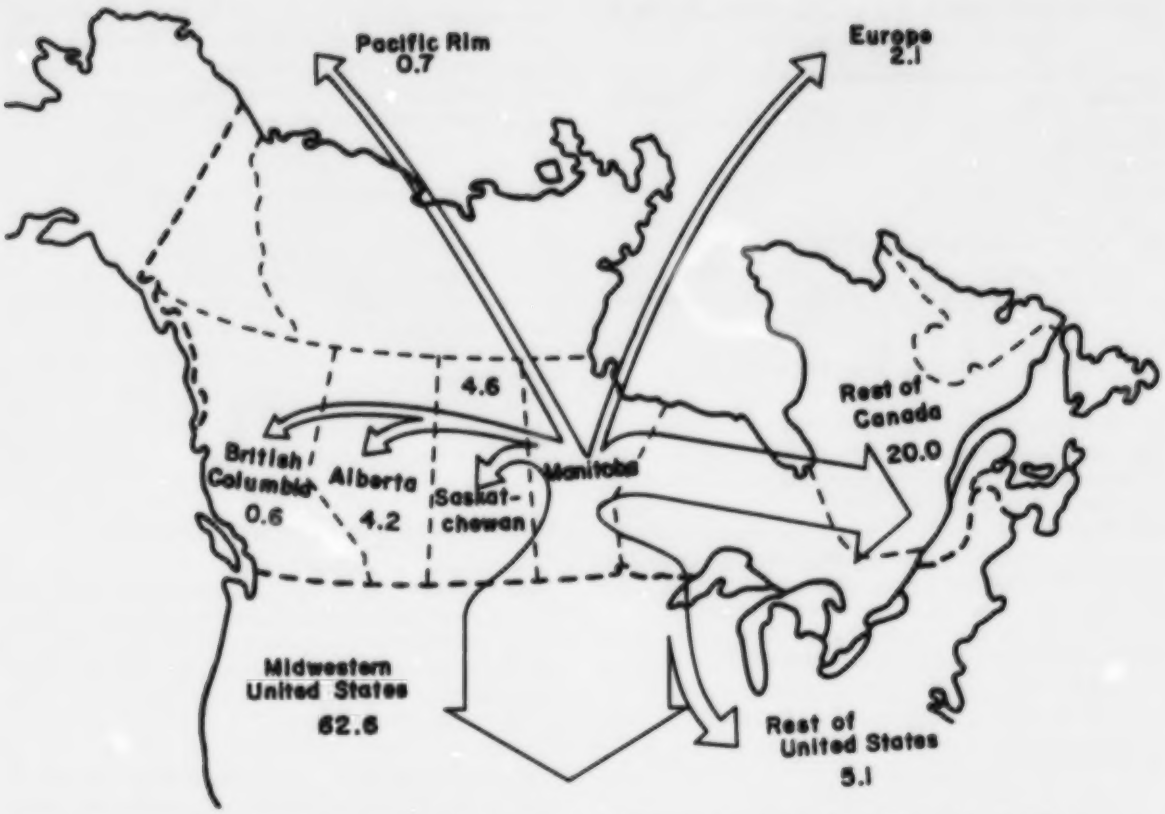


Figure 37. Destination of forest products exported from Manitoba, 1985. (Source: Bohning 1987.)

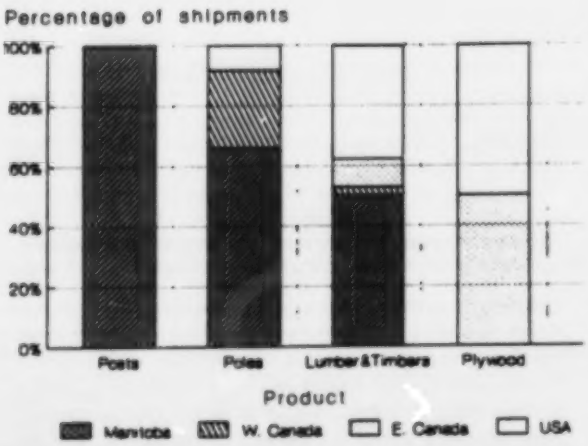


Figure 38. Markets for Manitoba's treated wood products, 1985.

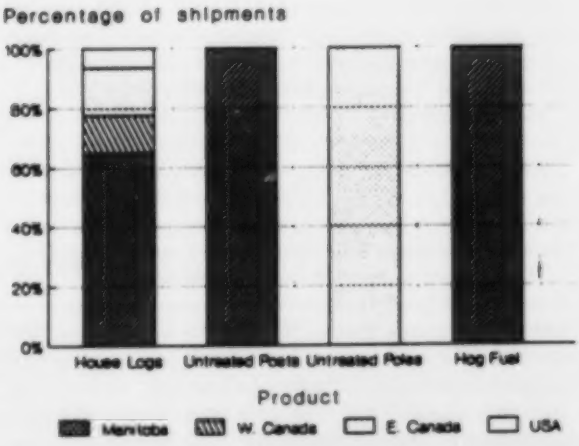


Figure 39. Markets for Manitoba's miscellaneous wood-using industry group, 1985.

Table 16. Markets for Manitoba lumber products by industry group, 1985 (M fbm)[a]

Market destination	Industry group											
	Greater than 5 MM fbm			1 MM - 5 MM fbm			100 M - 1 MM fbm			Independent planing mills		
	Dimension	Board	Timber	Dimension	Board	Timber	Dimension	Board	Timber	Dimension	Board	Timber
Local	0	0	0	2 824	435	350	2 493	578	673	800	200	0
Provincial	32 546	4 626	2 350	8 420	1 578	3 125	5 774	865	2 313	12 042	7 960	0
Other western provinces	0	0	0	1 623	344	255	328	77	225	1 200	1 830	0
Eastern Canada	0	0	850	0	0	396	0	0	301	1 200	1 580	20
Midwest U.S.A.	36 341	1 766	0	355	45	0	305	425	0	8 588	2 600	200
Europe	0	0	0	0	0	0	0	0	0	120	180	0

[a] Not including the 3300 M fbm produced by sawmills in the less than 100 M fbm size class.

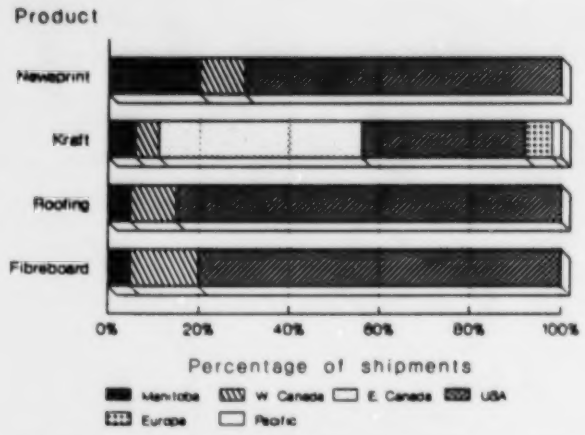


Figure 40. Markets for Manitoba's pulp, paper, and fiberboard products, 1985.

years, the concept of a world market has become a reality for many forest products. The emergence of nontraditional producers of forest products has sharpened the focus on competition and new products in an international setting (Veltkamp 1986).

The forest industry is not noted for product innovation, particularly when compared to sectors such as the computer or financial industries. New products and processes, however, are being developed and are changing the competitive landscape. The emphasis is now on manufacturing added value products that satisfy smaller, developing segments of a global market.

The market outlooks that follow were prepared and presented by Resource Information Systems Inc. at its annual conference held September 23-26, 1986, in Boston, Massachusetts.

Newsprint

For the period 1987-1990, demand growth for newsprint will be moderate. Advertising growth is projected to moderate in reaction to high ad rates and a slowdown in the real estate boom. During this period, grade competition will intensify as catalogs and retail inserts upgrade from newsprint to supercalendered and light-weight-coated papers. U.S. newsprint demand is projected to reach 12.7 million tonnes by 1990 — an average growth rate of 2% per year.

North American operating rates are forecast to be 97-98% from 1988 through 1990. These rates have increased consistently since the last recession. The higher rates are the result of increases in overseas exports associated with the declining U.S. dollar and past conservative capacity growth due to poor profitability. Profit margins will continue to show significant gains to 1990 as operating rates approach 100% of capacity.

Over the long-term (i.e., to the year 2000), prospects for capacity growth in North American newsprint are low. Future growth is expected to be limited due to circulation declines. Also, advertising, the major source of demand growth in the 1970s, will peak as insert advertising growth matures. The role of the electronic media will also have a slowing effect. The U.S. newsprint demand is forecast at 14.4 million tonnes in 2000. This represents a 1.5% annual growth.

World newsprint demand potential (excluding North America) is quite high, particularly in developing countries, due to increasing literacy, less grade competition, higher population growth, and stronger economic growth. The largest growth in demand will occur in Asia (Table 17). In spite of this growth overseas, North American export opportunities will be limited. Africa will soon become a net exporter of newsprint. Latin America, which is very cost competitive, is becoming more self-sufficient, and European demand growth will be limited as well. Asia presents the only export growth opportunity, but even there growth will be limited by increased production in Oceania (the Australia-New Zealand region) and Asia.

Table 17. Average annual newsprint demand growth to the year 2000. (Source: Maine 1987.)

Region	Growth (%)
U.S.A.	1.5
Europe	1.3
Japan	2.3
Other Asian	5.9
Brazil	4.9
Other Latin American	4.5
Africa	3.5
Oceania	2.8

Kraft Paper

The substitution of plastics has significantly affected the kraft paper industry. Over the past several years, production and shipments of kraft paper have been on the decline. Demand is forecast to slip further through the late 1980s, but not as rapidly as in the 1980-85 period, as market penetration of plastics begins to slow.

Unbleached capacity will continue to drop with demand. Significant mill closures are expected, and those mills that do not close will see their operating rates rise toward 100%. Profit margins for kraft paper will climb sharply in reaction to high operating rates, low producer inventories, declining costs, and a tight unbleached market. Through 1987-1990, margins will remain close to the 1980 level as capacity withdrawals will keep operating rates high.

Softwood Lumber

Average annual U.S. softwood lumber demand has grown from about 31 billion board feet in the 1950s to approximately 41 billion board feet in the 1980s, and the demand is forecast to grow to 46 billion board feet annually in the 1990s. Significant structural changes are occurring in the lumber market. The residential construction share of U.S lumber consumption has been steadily declining since 1950, and this trend should continue to the year 2000. The decline in the residential construction share of total demand will be offset by strong lumber demand for other uses, including repairs and remodeling, nonresidential construction, and industrial production.

Significant trends are also apparent on the supply side. In the 1950s, domestic producers accounted for 91% of U.S. domestic consumption, but by the mid-1980s, domestic producers' share had dropped to 69% of U.S. demand. Most of the increased import share has come from Canadian producers because of low wood costs, favorable exchange rates, location advantages, or ultra-modern mill infrastructure.

Added Value Products and Other Recent Product Developments

Traditionally, Manitoba's primary wood-using industry has manufactured fairly high volumes of commodity products for export. Processes and products, resulting from advances in machinery and adhesives, have been developed to address a number of concerns facing Canada's primary wood-using industry. These concerns include declining quality of the available resource, emphasis on closer utilization, competition from alternative materials, low profitability of commodity products due to world oversupply, and a shift in focus from selling to marketing (i.e., producing exactly to consumer specifications). These recently developed processes and products include the following:

i) glued products such as fingerjointed lumber (studs, boards, and planks); laminated veneer lumber (LVL); edge-glued boards; trapezoidal lumber, edge-glued and ripped (EGAR) products; laminated beams; reconstituted wood products (such as Parallam or Scrimber); and composite wood and metal, wood and paper honeycomb, or wood and plastic products.

ii) structural products such as laminated veneer lumber flanges with plywood or oriented strand board (OSB) web; I-beams using 2 x 4s as flanges with plywood or OSB web; and engineered beams or trusses using machine stress rated (MSR) lumber.

iii) treated wood products such as long-life preserved wood foundations, and fire-retarding wood via chemical treatment.

iv) products such as oriented strand board; medium density fiberboard; saw-dry-rip (SDR) lumber for furniture parts; System-6 furniture parts; and precision cut, automatically assembled windows, doors, etc.

v) pulp and paper products such as chemi-thermo-mechanical pulp; hardwood pulp; supercalendered papers, etc.

In the future, forest product firms will have to be more customer-oriented in their marketing and product planning. Consideration will also have to be given to grading and packaging codes and standards, custom-tailored products, small batch sizes for small-scale customers, shorter lead times, precise delivery dates, and in-transit protection against damage.

CHAPTER VII

THE SOCIOECONOMIC IMPACT OF MANITOBA'S PRIMARY WOOD-USING INDUSTRY

Manitoba's forest sector has both a direct and an indirect impact upon the provincial economy. Direct economic effects are assessed by measuring factors such as industry output, employment, and income.

Indirect impact occurs when revenues generated by direct activity are used to purchase goods and services in other sectors of the local economy. For example, money earned by loggers and sawmill workers is spent locally at retail shops, gas stations, grocery stores, etc. Each of these sectors, in turn, purchases additional products. This phenomenon is known as the multiplier effect.

In Chapter I, two definitions of Manitoba's forest sector were provided. Both of those definitions are employed in this chapter. Primary wood-using industries refer to those industry groups included in the 1985-86 Forintek conducted survey. The "forest industry" refers to those industry groups included in the following Statistics Canada categories: logging (SIC 04), wood industries (SIC 25), and paper and allied industries (SIC 27).

Position of the Forest Industry in Manitoba

One approach to describing the socioeconomic impact of the forest industry is to compare it with other sectors within the provincial economy. Figure 41 shows that Manitoba has a diversified economy based upon well-developed agriculture and manufacturing sectors and a large service sector. The forest industry, specifically, is considered to be a component of the manufacturing sector. For the remainder of this chapter, the position of the forest industry within the Manitoba economy will be discussed in terms of its contribution to Manitoba's manufacturing sector.

In 1984, the forest industry ranked sixth in total manufacturing sector value added and represented 8.2% of the provincial manufacturing sector[12] (Fig. 42). Disaggregated, the paper and allied industries, the wood industries, and the logging industry ranked 9th, 13th, and 16th, respectively.

Employment, Multipliers, and Induced Effects

Total employment is an important measure of an industry's contribution to the economy. It is comprised of both direct and indirect components. Jobs directly created by forestry activity are considered as direct employment. Examples include loggers, sawmillers, pulp and paper workers, log scalers forklift operators, and many more. As revenue generated by direct activities is spent and respent, employment is increased in other, nonrelated industries. For example, increases in logging activity give rise to increases in the transportation and retail sectors. These are examples of indirect effects. Total employment impact — that is, the sum of direct and indirect components — is derived through the application of employment multipliers.

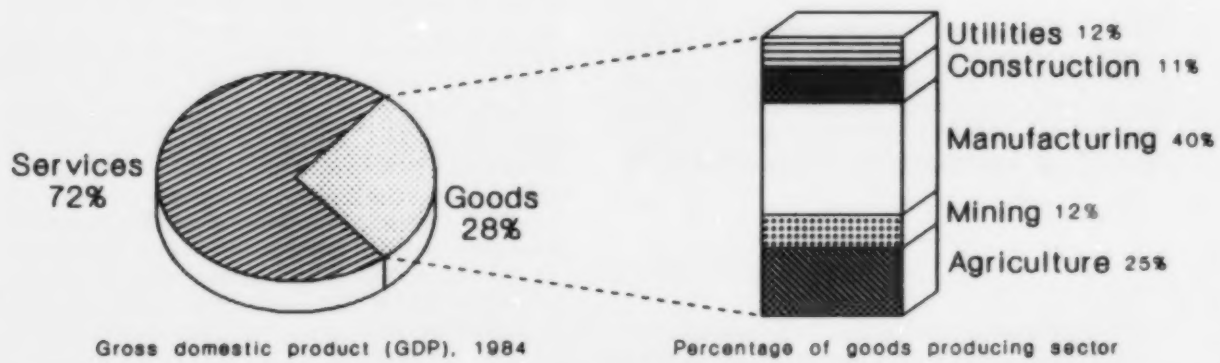


Figure 41. Structure of the Manitoba economy, 1984. (Source: Manitoba Bureau of Statistics 1986.)

[12] For the purpose of this discussion, logging statistics (SIC 04) have been incorporated into the manufacturing sector. While logging is not a manufacturing industry, per se, it is an integral component of the forest sector. Omission of logging data would lead to an incorrect description of the role of forestry within the provincial economy.

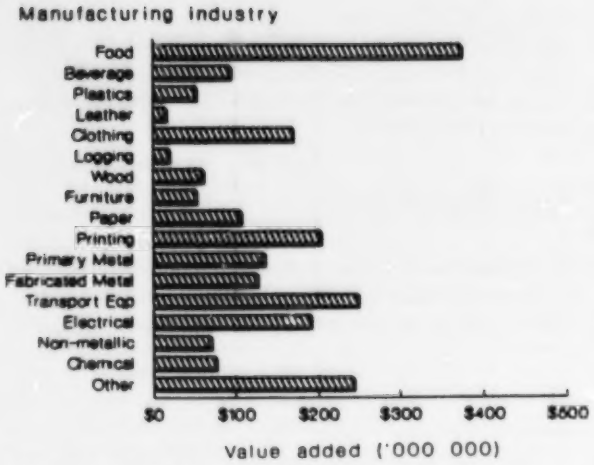


Figure 42. Total value added in Manitoba's manufacturing sector, 1984. (Source: Statistics Canada 1986b.)

Direct and Indirect Employment

In 1985, direct employment created by Manitoba's primary wood-using industry totaled over 2848 person-years and represented 1.4% of Manitoba's employed labor force. The pulp, paper, and fiberboard group dominated the industry by generating approximately 56% of all forestry employment. Large sawmills were second in importance and accounted for another 23% (Fig. 43).

A breakdown of employment by work type shows that most jobs were in the areas of woodlands (46%) and mill/office and sales (48%). Only a small amount of employment was associated with purchased roundwood or contract-sawn lumber. On a regional basis, primary wood-using industry employment was concentrated in four forest sections: Saskatchewan River, 44%; Pineland, 38%; Aspen Parkland, 8%; and Mountain, 8% (Fig. 44). Woodlands and mill/office and sales jobs were fairly evenly distributed within each forest section except Aspen Parkland. A concentration of processing plants in Winnipeg, along with limited harvesting activity, explain this anomaly.

The primary wood-using industry provides employment opportunities for Manitoba's native population. In 1985, a full 18% (519 person-years) of all forestry workers were of native ancestry, the majority of whom were employed in the logging industry. This reflects the rural aspect of forestry, where logging activity is most often located in or near areas settled by native populations. The pulp, paper, and fiberboard group employed the most natives (50%), followed by the large sawmill group (27%) (Fig. 45). Native participation in the primary wood-using industry was concentrated in the Saskatchewan River Forest Section (Fig. 46). This reflects the combination of a large native population and a large number of forestry-related employment opportunities in that region.

Both the number of jobs and the duration of work are important factors in assessing employment impacts. Forestry work is seasonal in nature and results in varied lengths of employment. For example, logging may create 90 jobs, but these jobs last only 4 months.

Harvesting and shipping roundwood were concentrated in the period from November to late March, when frozen ground conditions generally facilitate woodlands access (Fig. 47). Mill/office and sales employment remained fairly stable throughout 1985,

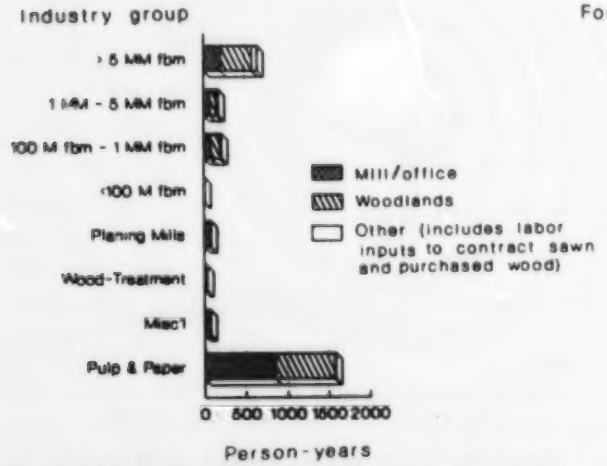


Figure 43. Direct employment among Manitoba's primary wood-using industries, 1985.

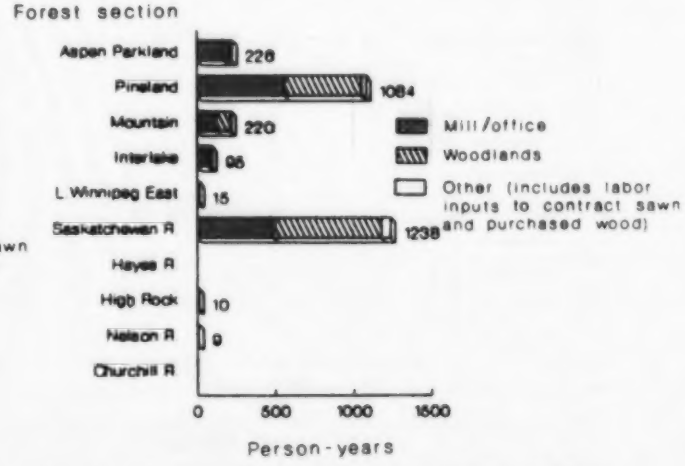


Figure 44. Direct employment by forest section, 1985.

ranging from a low of 1239 person-months in December to a high of 1474 person-months in April. The manufacture of forest products is a technological process that, on a large scale, is extremely expensive to shut down and start up. Hence, mill managers attempt to ensure that the mills operate continuously, and therefore, mill/office and sales employment shows little variation through the year.

Generally the Manitoba primary wood-using industry relies on its own workers for processing operations; however, there has been a trend towards the increased use of contractors in harvesting (Fig. 48). In 1980, 487 workers, or 17% of the work force, were employed as contractors (Ondro and Williamson 1984). By 1985, the number of contract employees had increased to 750, representing 26% of all primary wood-using industry employment.

Employment Multipliers

Multipliers are used to derive estimates of total employment impact. The Manitoba Bureau of Statistics has calculated a series of forest industry multipliers

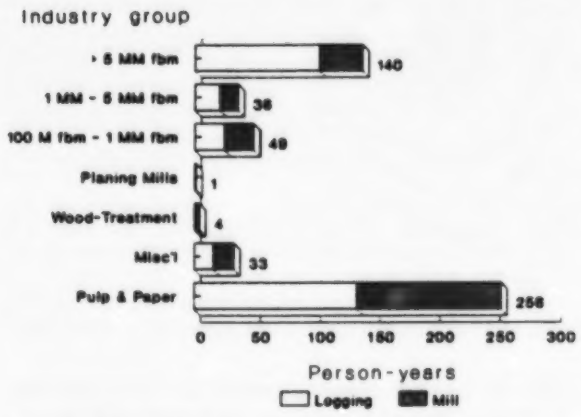


Figure 45. Native employment by primary wood-using industry group, 1985.

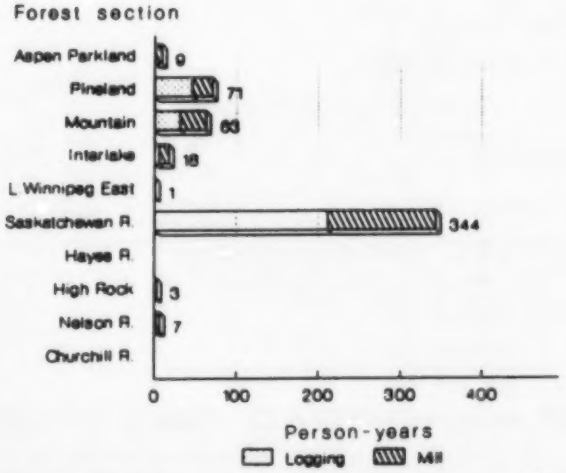


Figure 46. Native employment by forest section, 1985.

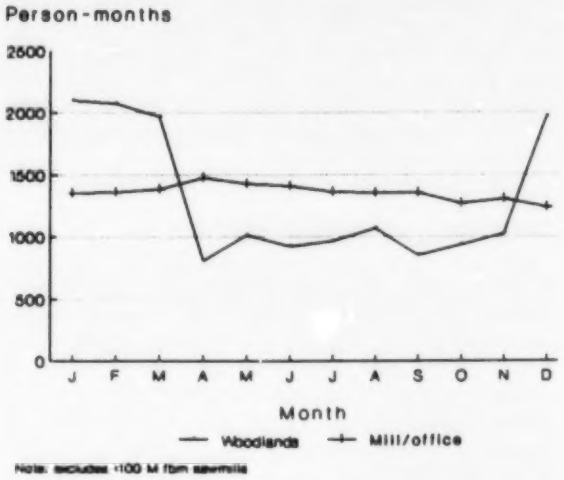


Figure 47. Seasonality of employment in Manitoba's primary wood-using industry, 1985.

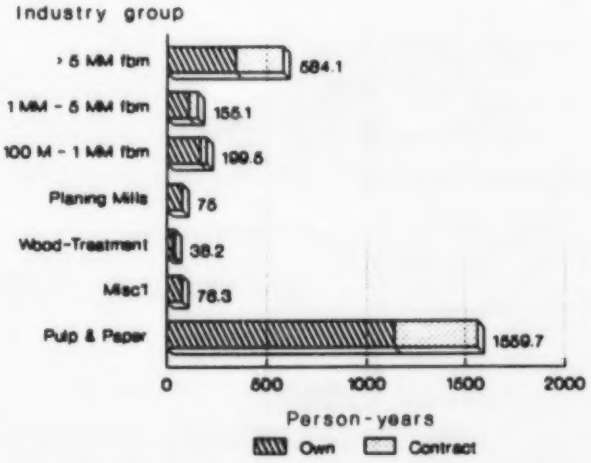


Figure 48. Own vs. contract employees in Manitoba's primary wood-using industry, 1985.

based on an interprovincial input/output model designed by Statistics Canada.[13] The multipliers presented in Table 18 are modified to reflect the primary wood-using industry classification used in this report.

Manitoba's average employment multiplier for the primary wood-using industry was 2.946 in 1985. This means that for each forestry job, an additional two jobs were created in the province through indirect employment effects. The pulp, paper, and fiberboard group had the largest multiplier (3.257). Mills in this industry group were large, complex operations that required an extensive and well-developed infrastructure, which accounts for the large multiplier. Smaller plants, such as wood preservation mills and miscellaneous mills, did not require the same level of support and consequently had a correspondingly smaller multiplier effect.

In 1985, the total impact of the primary wood-using industry was 8391 person-years of employment, of which 2848 were direct and 5543 indirect. The pulp, paper, and fiberboard group had the greatest employment impact, creating 61% of all forestry-dependent jobs (Table 18).

Wages and Salaries

Labor is compensated for its efforts through the payment of wages and salaries. In 1984, the Manitoba forest industry paid out over $96 million to its employees. This equaled approximately 9% of the total wages paid by the manufacturing sector (Fig. 49).

Average annual income per employee was $26 664 in the paper and allied industries, $23 766 in the logging industry, and $18 854 in the wood industries (Fig. 50). Two factors that gave rise to the higher wages of the paper and allied industries were the high degree of job skill required (which commanded a higher salary) and the presence of unions.

One measure of labor intensity within an industry is the percentage of sales spent on wages. The higher the percentage, the higher the labor component involved in the manufacturing process. Approximately 26% of sales was used to compensate labor in the wood industries and 25% in the logging industry (Fig. 51). These were the sixth and eighth highest percentages respectively within the manufacturing sector and are indicative of the high labor and low

Table 18. Total employment impact in Manitoba's primary wood-using industry, 1985

	Direct employment (person-years)	Multiplier[a]	Indirect employment (person-years)	Total employment (person-years)
Sawmills				
Greater than 5 MM fbm	584	2.803	1053	1637
1 MM - 5 MM fbm	155	2.803	279	434
100 M - 1 MM fbm	199	2.803	359	558
Less than 100 M fbm	17	2.803	31	48
Independent planing mills	75	2.803	135	210
Wood treating plants	38	1.912	35	73
Miscellaneous mills	76	1.912	69	145
Pulp, paper, and fiberboard mills	1560	3.257	3521	5081
Independent log producers	144	1.424	61	205
Primary wood-using industry total	2848	2.946	5543	8391

[a] Calculated as a weighted average based on direct employment to reflect the primary wood-using industry classification used in this report.

[13] These statistics were obtained from: Gravelines, L. 1986. Forest industry employment statistics. Manit. Nat. Resour., Econ. Prog. Rev. Sect., Winnipeg, Manit. (Internal report.)

capital inputs that generally characterize Manitoba's logging and sawmill industry. The paper and allied industries, which were more capital-intensive by comparison, directed only 18% of sales toward the compensation of labor.

More-detailed information on wages and salaries was obtained from the complete census of the forest industry undertaken by Forintek Canada Ltd. Because different data collection methods were employed, the wage and salary statistics that follow differ from those presented by other agencies. For the purpose of this discussion, absolute values are not as important as the distribution of wages and salaries among Manitoba's forest industry groups and forest sections.

The pulp, paper, and fiberboard group contributed 64% of all 1985 gross wages and salaries paid by the primary wood-using industry (Figure 52). This is not surprising given that this industry group was the largest forestry employer in Manitoba. Sawmills in the 5MM fbm and over category had the second-largest payrolls. These mills, together with the pulp, paper, and fiberboard group, accounted for 90% of all wages and salaries paid by the forestry sector.

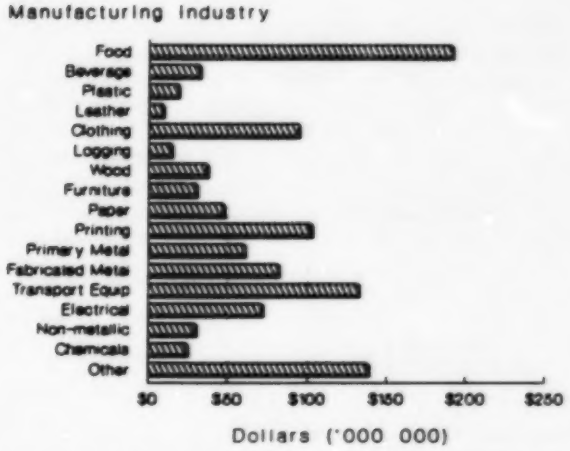


Figure 49. Total wages and salaries in Manitoba's manufacturing sector, 1984. (Source: Statistics Canada 1986b.)

Figure 50. Average annual income in Manitoba's manufacturing sector, 1984. (Source: Statistics Canada 1986b.)

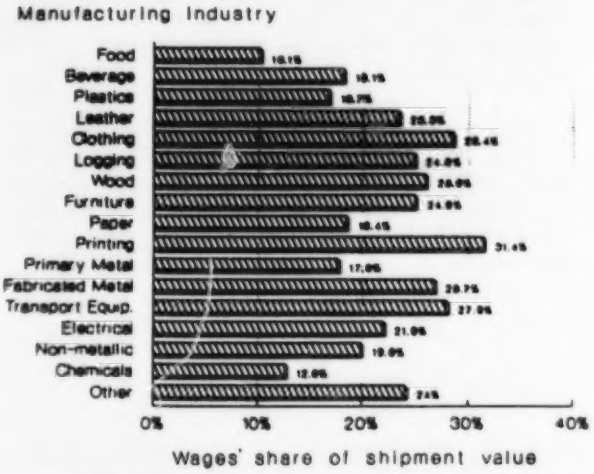


Figure 51. Labor intensity in Manitoba's manufacturing sector, 1984. (Source: Statistics Canada 1986b.)

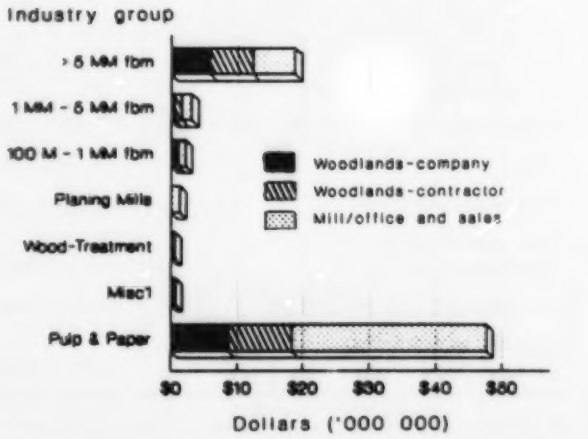


Figure 52. Gross wages and salaries paid by the primary wood-using industry group, 1985.

Forestry is a Growth Industry

For any regional economy to grow and develop, it must attract new money through the sale of export products and services. Growth in the economy is achieved by spending within the province the revenue generated by exporting (the multiplier effect). In addition, revenues received from exporting are required to compensate for the drain of dollars that occurs from payments for imports.

Export-oriented industries comprise the region's economic base (Canham 1985; Maki et al. 1985). Generally, most manufacturing activity is considered basic, while service and residential activity (e.g., retail shops, gas stations, grocery stores) are primarily geared to producing for local needs (Maki et al. 1985).

Manitoba's primary wood-using industry generated approximately $153 million in 1985 through the sale of export goods. This represented 70% of the value of all provincial primary wood-using industry sales. Forestry continues to be a basic activity and an important source of new money within the province; further development of the primary wood-using industry would serve as a catalyst for economic growth.

Community Stability and Development

Numerous rural Manitoba communities are dependent upon the forest resource as their major or only economic base. The socioeconomic well-being of these areas is highly sensitive to trends and cycles in the forest industry that are, in large part, beyond the community's control (White et al. 1986). Thus, it is important for policy-makers and managers to know the location of forestry-dependent communities when evaluating forestry-related opportunities and programs (Schuster et al. 1975; White et al. 1986).

Location quotients are one tool that can be used to describe the degree to which a geographical area is experiencing concentration or specialization in a particular industry (Schuster et al. 1975). They are calculated by comparing a characteristic of a specific industry in a specific location with the same characteristic in a larger base system. For example, if 20% of Community A's employment is found in the forest industry while only 5% of Manitoba's employment is in the forest industry, the location quotient for Community A is 4 (i.e., [20/5]). The value shows that employment in Community A is 400% more concentrated in forestry than the provincial average.[14] This method is a simplified approach to identifying forestry-dependent communities (Schuster et al. 1975).

Using 1981 Census of Canada data, employment-based location quotients were calculated for the logging and forestry service, wood, paper and allied, and total forest industries by census subdivision. Table 19 presents the location quotients for Manitoba's 37 most forestry-concentrated communities.

Table 19 shows that native communities were highly dependent upon the forest resource as a source of employment. Of the 37 most forestry-dependent communities, 15 were Indian reserves. Within many of these communities, opportunities for growth were limited and forestry was identified as the sole source of economic development.

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[14] The Manitoba provincial average is 0.0014 or 1.4%.

Table 19. Forestry-dependent communities in Manitoba, 1985. (Source: Statistics Canada 1983.)

Location	Classification[a]	Number employed (actual)					Location quotients			
		Total	Logging and services	Wood industries	Paper and allied	Total forestry	Logging and services	Wood industries	Paper and allied	Total forestry
Powerview	VL	330	5	0	170	175	5.2	0.0	87.0	37.6
The Pas 211	R	95	0	25	20	45	0.0	50.2	35.5	33.6
Dawson Bay 65A	R	75	30	0	0	30	137.1	0.0	0.0	28.4
Alexander[b]	LGD	1235	10	0	390	400	2.8	0.0	53.3	23.0
Piney	LGD	740	125	75	0	200	57.9	19.3	0.0	19.2
Consol (Wanless)	LGD	115	5	15	10	30	14.9	24.9	14.7	18.5
Consol (Cranberry Portage)	LGD	500	75	30	15	120	51.4	11.4	5.1	17.0
The Pas 21A	R	135	10	10	10	30	25.4	14.1	12.5	15.8
Park (North)	LGD	190	35	0	0	35	63.1	0.0	0.0	13.1
The Pas	T	3145	100	100	360	560	10.9	6.1	19.3	12.6
Mountain (North)	LGD	585	80	20	0	100	46.9	6.5	0.0	12.1
Valley River 63A	R	30	5	0	0	5	57.1	0.0	0.0	11.8
The Pas 21E	R	290	10	20	15	45	11.8	13.1	8.7	11.0
Fort Alexander 3	R	355	35	0	20	55	33.8	0.0	9.5	11.0
Black River 9	R	35	5	0	0	5	49.0	0.0	0.0	10.1
Hillsburg	RM	290	0	40	0	40	0.0	26.3	0.0	9.8
Niverville	VL	515	0	70	0	70	0.0	25.9	0.0	9.6
Oxford house 24	R	160	5	15	0	20	10.7	17.9	0.0	8.9
Hole at Hollow Water 10	M	120	15	0	0	15	42.8	0.0	0.0	8.9
Mountain (South)	LGD	520	45	10	0	55	29.7	3.7	0.0	7.5
Consol (Carrot Valley)	LGD	935	5	40	45	90	1.8	8.2	8.1	6.8
Reynolds	LGD	535	35	10	5	50	22.4	3.6	1.6	6.6
Steinback	T	3155	0	270	5	275	0.0	16.3	0.3	6.2
Berens River 13	R	130	10	0	0	10	26.4	0.0	0.0	5.5
Cross Lake 19	R	70	0	5	0	5	0.0	13.6	0.0	5.1
Brokenhead 4	R	70	5	0	0	5	24.5	0.0	0.0	5.1
Manitou	VL	340	0	20	0	20	0.0	11.2	0.0	4.2
Moose Lake 31A	R	90	5	0	0	5	19.0	0.0	0.0	3.9
Stuartburn	LGD	720	30	10	0	40	14.3	2.6	0.0	3.9
Island Lake 22A	R	185	5	5	0	10	9.3	5.2	0.0	3.8
Fairford 50	R	100	5	0	0	5	17.1	0.0	0.0	3.5
Roblin	T	770	0	35	0	35	0.0	8.7	0.0	3.2
Minitonas	VL	225	10	0	0	10	15.2	0.0	0.0	3.2
Rivers	T	490	0	10	10	20	0.0	3.9	3.4	2.9
Hanover	RM	3205	0	130	0	130	0.0	7.7	0.0	2.9
Swan River	T	1490	20	40	0	60	4.5	5.1	0.0	2.9
Ste. Anne	RM	1260	15	25	10	50	4.1	3.8	1.3	2.8

[a] Classification: R = Reserve; T = Town; RM = Rural Municipality; LGD = Local Government District; VL = Village; CD = Census Division.
[b] The Alexander local government district includes the community of Pine Falls.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

Manitoba's primary wood-using industry contributes to the strength and diversity of the provincial economy. In 1985, the 176 firms in the industry generated a total of 2848 person-years of direct employment and 8391 person-years of combined direct and indirect employment. Two important aspects of forestry employment are that it is seasonal and rural by nature. Therefore, the forest sector generally provides significant employment opportunities for persons of native ancestry and alternative off-season employment for agricultural workers and farmers.

The Manitoba economy is dominated by the agricultural, manufacturing, hydroelectric, and financial service sectors. Although forestry is not a major industry at the provincial level, the primary wood-using industry is a critical component of a number of rural economies in the province. Major communities with a high forest sector concentration include Pine Falls, The Pas, and Steinbach, and a number of native communities also demonstrate a heavy dependance on forestry. Forest sector development has and can continue to be a viable element of a strategy for rural economic development. The value of the forest industry for facilitating rural development is strengthened by the fact that the industry relies heavily on export markets.

The total value of shipments by Manitoba's primary wood-using industry in 1985 was $220 million; 70% of this revenue was generated from the sale of forest products to markets outside the province. Market destinations ranged from neighboring provinces to overseas markets in Europe and the Pacific Rim; however, the most predominant market destination was the U.S., accounting for $104 million in sales. Other Canadian provinces imported $45 million of Manitoba's forest products.

Based on current levels of utilization and the productive capability of the resource to produce fiber on a sustained basis, there are opportunities for further forest industry development in Manitoba. At the provincial level the current cut is only 24% of the softwood annual allowable cut (AAC) and 7% of the AAC for hardwoods. The indicated softwood surplus is 4.5 million m^3 per year and, for hardwoods, 2.2 million m^3 annually. This surplus volume, however, is distributed over large areas on a large number of small stems and, in some cases, is located in regions that lack a developed transportation infrastructure. Thus, delivered wood costs in Manitoba tend to be higher than in other competing regions. Future industry developments in Manitoba will have to reflect and be tailored to the Manitoba forest resource. Suitable production methods include those that have high recovery rates, are capable of utilizing small diameters, can utilize the hardwood resource, or obtain maximum value from available higher-quality softwood resources.

At the national level, Canada is the world's leading forest products exporter and Manitoba has contributed to this position. This situation, however, is changing. A global forest products market is developing. The decline of old-growth forests, the emergence of new suppliers in Brazil, Chile, New Zealand, and other nontraditional producing areas, the gradual shift in economic and purchasing power from North America to southeast Asia, and increasing competition from nonwood fiber-based substitute products will put increased competitive pressure on the Canadian industry to respond and adapt. As high-cost producers, the imperative for Manitoba producers to be responsive is even greater than in producing provinces such as B.C., Alberta, and Nova Scotia.

A progressive development strategy for Manitoba's primary forest industry should be tailored to incorporate Manitoba's basic strengths and to minimize the influence of the province's basic weaknesses. Manitoba's principal comparative advantages include a location advantage for U.S. market access, low energy and labor costs, and the physical availability of both hardwood and softwood resources. The principal disadvantages facing potential investors are high delivered wood costs and low factor productivity.

In identifying appropriate production technology for Manitoba's circumstances, desirable criteria include high power intensity, high labor intensity, and low fiber intensity (i.e., high recovery rates). From a marketing standpoint, the pursuit of a product mix reflecting higher value added, knowledge-intensive products and higher-valued, semi-commodity products will enhance the competitive position of Manitoba producers in the developing global forest economy.

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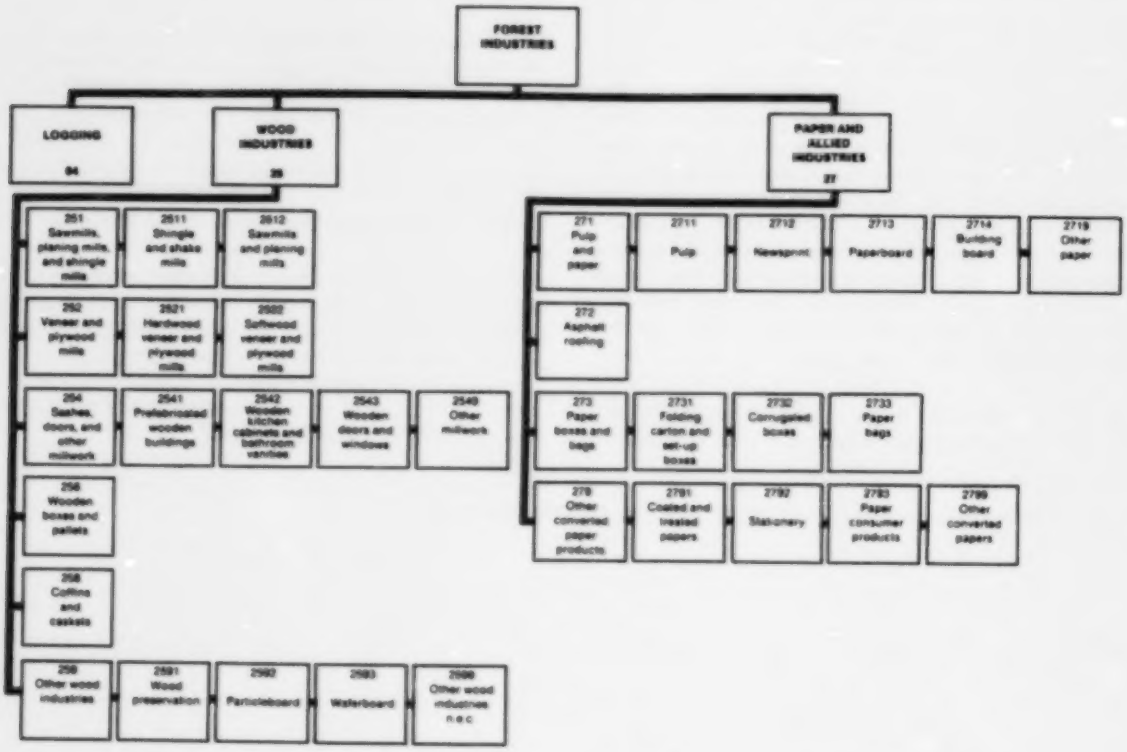
APPENDIX 1

STANDARD INDUSTRIAL CLASSIFICATION (SIC) OF THE PRIMARY WOOD-USING INDUSTRIES

(Source: Statistics Canada 1980.)



APPENDIX 2

DATA COLLECTION AND PROCESSING METHODS

Primary data were obtained from a 100% census of the largest forestry firms[1] in the province (i.e., the primary wood-using industry). During the winter of 1985-86, research scientists from Forintek Canada Corporation, using a detailed questionnaire, conducted interviews with owners and managers of all large mill operations. Data were collected for a 1-year period (either fiscal or calendar) ending in 1985. Follow-up telephone calls were used to complete and verify the data when necessary. Some data for small operations (i.e., sawmills producing less than 100 M fbm per year) were obtained from the provincial forestry records of Manitoba Natural Resources. Given the method of data collection and the level of sampling intensity, differences may exist between the information presented in this report and information available from other sources.

The data are provided at the most detailed level feasible without disclosing sensitive information. To ensure confidentiality, information for fiberboard and asphalt roofing manufacturers are aggregated with data from the pulp and paper industry.

Secondary data were obtained from Statistics Canada. This information is used to supplement the survey data and to permit comparison among industries and provinces. Due to confidentiality requirements, data are presented at the two-digit level for the logging industry (SIC 04), the wood industries (SIC 25), and the paper and allied industries (SIC 27). Collectively these industries are referred to as the "forest industry."

Production statistics for the sawmill and the independent planing mill groups are presented in Imperial units (board feet). This is done to accommodate mills within these two industry groups as they continue to manufacture and market their products using imperial dimensions. Metric units are used to describe production data for all other industries.

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[1] Small sawmills producing less than 100 M fbm per year were excluded from the survey.